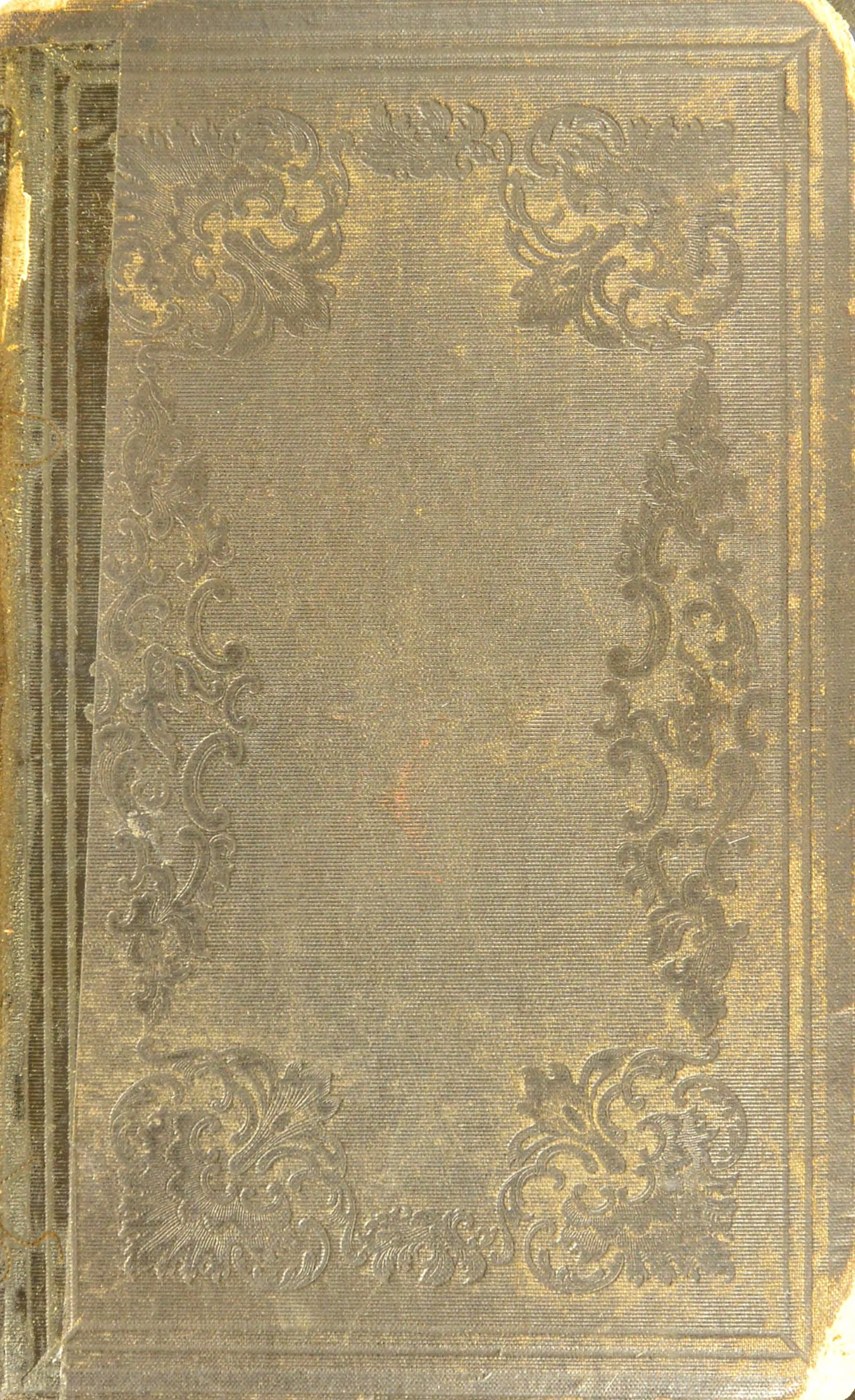

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USES AND MODE OF ADMINISTRATION;

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A COMPLETE CONSPECTUS OF THE BRITISH PHARMACOPŒIAS, AN ACCOUNT OF NEW REMEDIES, AND AN APPENDIX OF FORMULÆ.

BY

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FELLOW OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS IN IRELAND,
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Fifth Edition.

DUBLIN: FANNIN & CO.
Booksellers to the Royal College of Surgeons in Ireland.
EDINBURGH: MACLACHLAN AND STEWART.
LONDON: LONGMAN AND Co.
MDCCCLVIII.

DUBLIN:
PRINTED BY RICHARD D. WEBB, GREAT BRUNSWICK STREET.

605960

TO

DOCTOR P. H. MALMSTEN,

OF STOCKHOLM,

THE FIFTH EDITION OF MY WORK ON THE MATERIA MEDICA IS DEDICATED;

IN EVIDENCE OF MY

ESTIMATION OF HIS TALENTS AS A PRACTICAL PHYSICIAN,

AND FROM FEELINGS OF

FRIENDSHIP AND ESTEEM.

J. MOORE NELIGAN.

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MEDICINES,

THEIR USES AND MODE OF ADMINISTRATION.

CHAPTER I.

ANTACIDS.

(Alkalines—Antilithics—Absorbents—Lithontriptics.)

ANTACIDS may be defined in general terms, to be medicines which correct acidity by combining chemically with any free acid that may exist in the stomach or digestive organs, and neutralizing it. Their action is manifestly only temporary and palliative, as they do not correct that peculiar state of the digestive organs which causes the formation of acid ; their protracted use, indeed, produces a tendency to acid secretion in the alimentary canal; and few individuals can bear the continued use of free or carbonated alkalies, a state of general anemia, usually attended with oxalic acid deposits in the urine, and symptoms somewhat analogous to those of scurvy being caused thereby. Antacids should, therefore, be prescribed in combination with *vegetable tonics;* and in no case should their administration be long persisted in without occasional interruptions. Besides their merely chemical action, alkaline remedies aid the digestion and thereby promote the assimilation of fatty matters, thus resembling to a certain extent the action of the bile and pancreatic juice; they are consequently indicated when there is a deficiency of these secretions. When administered in full doses or their use continued for some time, the fibrine of the blood becomes diminished in quantity, and with the view of producing this effect alkalies are sometimes employed in inflammatory affections. One or two circumstances relating to the particular remedy of this class which ought to be employed, when they are administered with the intention of correcting acidity, may be here noticed :—When the acid exists in the stomach in the gaseous state, ammonia and its carbonate should be preferred, as, in consequence of their volatility, a gaseous acid, which would elude the action of the fixed alkalies, may be neutralized by them. If the acidity be present in the lower bowels, as in the cœcum or colon, magnesia or lime ought to be administered, as being less likely than the other antacids to be neutralized or absorbed before they reach that portion of the intestinal canal. When the acid exists in the urinary organs, the alkalies will be found best adapted, as they have a tendency to act more directly on the kidneys ; and where it is *lithic acid* that predominates in the urine, the preparations of potash should be preferred to those of soda, as the salt formed by the combination of the former with the acid in question is much more soluble than that formed with the latter. In persons of a corpulent habit of body potash is to be preferred to ammonia or soda when the use of an alkali is indicated. And finally ammonia and its preparations are best adapted for the old and debilitated as also for those of enfeebled constitution.

AMMONIÆ LIQUOR, D. L. AMMONIÆ AQUA, E. *Aqueous solution of Ammonia.* (Syn. *Ammoniæ causticæ aqua,* D.)

PREPARATION—An article of the Materia Medica in the London Pharmacopœia. *Dublin.* "Sal-ammoniac, in fine powder; fresh burned lime, of each eight ounces; water, four ounces ; distilled water, sixteen ounces ; pour on the lime the four ounces of water ; and, when the slaked lime has cooled, mix it well with the sal-ammoniac by trituration in a mortar. Introduce the mixture into a mattrass of glass, or, if such can be had, an iron bottle, and, having closed this by means of a cork perforated by a suitable tube conveying off the gas, apply, with the intervention of sand, a gentle heat which must be gradually augmented, and cause the ammonia, as it is evolved, to pass first through a small Wolfe's bottle furnished with a syphon safety tube containing mercury ; and thence to the bottom of a pint bottle containing the distilled water. The temperature of the latter must be prevented from rising as the absorption of the gas proceeds, by surrounding the bottle which contains it with cold water, which should be frequently renewed." *Edinburgh.* Sal-ammoniac, ℥xiij. ; quicklime, ℥xiij. water, f℥viiss. ; distilled water, f℥xij. ; slake the lime with the water ; cover it up till it cools ; triturate it well and quickly, with the sal-ammoniac previously in fine powder ; and put the mixture into a glass retort, to which is fitted a receiver with a safety tube. Connect with the receiver a bottle also provided with a safety tube, and containing f℥iv. of the distilled water, but capable of holding twice as much. Connect this bottle with another loosely corked, and containing the remaining f℥viij. of the distilled water. The communicating tubes must descend to the bottom of the bottles at the farther end from the retort ; and the bottles and receiver must be kept cool by snow, ice, or a running stream of very cold water. Apply to the retort a gradually increasing heat till gas ceases to be evolved ; remove the retort, cork up the aperture in the receiver where it was connected with the retort, and apply to the receiver a gentle and gradually-increasing heat, to drive over as much of the gas in the fluid contained in it, but as little of the water as possible. Should the liquid in the last bottle not have a density of 960, reduce it with some of the strong ammonia in the first bottle, or raise it with distilled water so as to form aqua ammoniæ of the prescribed density. The strong aqua ammoniæ in the first bottle may be reduced to form the weaker solution, by diluting it with two parts and a-half of water."

PHYSICAL PROPERTIES.—A colourless limpid liquid, with a pungent ammoniacal odour, and a very acrid alkaline taste. The specific gravity varies with the strength of the preparation ; that of Dublin is directed to be ·950, that of London and Edinburgh ·960.

CHEMICAL PROPERTIES.—A solution of gaseous ammonia in water ; Ammonia is composed of $N. H^3$. ; or of 1 equivalent of *amidogene*, and 1 of hydrogen, (Kane.) At 32° F. water may be made to absorb 780 times its volume of the gas ; according to the table of Sir H. Davy, the solution of the Dublin Pharmacopœia contains about 12·75 per cent., that of London and Edinburgh about 10 per cent of ammonia. It neutralizes acids with which it forms salts ; gives a brown colour, which is only temporary, to litmus paper, and forms dense white fumes with the vapour of hydrochloric acid. Exposed to the air, part of the gas escapes rapidly in consequence of its volatility, while the remainder, absorbing carbonic acid, is converted into carbonate of ammonia, which remains in solution. Cooled down to — 40° F. a strong solution freezes into long silky needles ; at + 50° it boils ; the weak solution of the pharmacopœias boils at about 150°.

ADULTERATIONS.—Solution of ammonia often contains carbonate of ammonia, which is known by its effervescing with acids, or by lime water causing a white precipitate in it ; and hydrochlorate of ammonia, which is detected by solution of nitrate of silver producing a white precipitate nitric acid having been previously added to saturation. The presence of sulphuric acid may be recognized by the addition of a solution of chloride of barium, and that of lime by solution of oxalate of ammonia, producing white precipitates. That it is of the proper strength is indicated by its being of the prescribed density. Dr. Douglas Maclagan has described an adulteration of commercial water of ammonia with *pyrrol*, which, he supposes, occurs from its being distilled directly from the refuse water of the gas-house. The presence of this principle renders it completely unfit for use in either medicine or pharmacy. It may be readily detected by adding pure nitric acid, which produces a red colour afterwards becoming purple, if any *pyrrol* be present. The following are the tests for its purity proposed by the London and Edinburgh Colleges :—*London.* " By heat it totally evaporates in evanescent alkaline vapours as shown by turmeric. It gives no precipitate with lime water ; nor is it coloured by hydrosulphuric acid being poured in. When saturated with nitric acid, neither sesquicarbonate of ammonia, nitrate of silver, nor chloride of barium throws down anything ; 100 grains of the solution contain nearly 10 grains of ammonia." *Edinburgh.* " Diluted nitric acid occasions no effervescence : when saturated with nitric acid, it is not precipitated by solution of nitrate of silver."

THERAPEUTICAL EFFECTS.—Ammonia acts as an antacid directly by its neutralizing powers ; it also stimulates powerfully the digestive organs. It is, therefore, to be preferred to the other remedies of this class, in cases where we wish to combine the effects of a stimulant and antacid, as in cardialgia and flatulence arising from acidity of the stomach in debilitated constitutions; but if there is any tendency to inflammation present, it should not be employed. As an antidote in poisoning with the mineral acids, it is not so valuable as the other alkalies; but in cases of poisoning with prussic acid, oil of bitter almonds, &c., it is especially serviceable, its action on the system being directly to counteract the sedative effects of that acid. (See, *Caustics, Epispastics* and *General Stimulants.*)

DOSE AND MODE OF ADMINISTRATION.—Min. x. to min. xxx. diluted with at least one ounce of water, syrup, or any bland fluid.

INCOMPATIBLES.—All acids; and the earthy and metallic salts, except those of potash, soda, lime, and baryta.

In poisoning with ammonia the best antidotes are the vegetable acids.

AMMONIÆ BICARBONAS, D. *Bicarbonate of Ammonia.*

PREPARATION.—"Take of commercial sesquicarbonate of ammonia, any convenient quantity: Reduce it to a fine powder, and having spread it on a sheet of paper, expose it to the air for twenty-four hours. Let it be now enclosed in a well stopped bottle."

PHYSICAL PROPERTIES.—The salt, when prepared by crystallization, may be obtained in large crystals of the right rhombic prism series; it has a weak ammoniacal odour, and a saline taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of ammonia, 2 of carbonic acid, and 2 of water; or of 1 equivalent of *amidogene,* 1 of hydrogen, 2 of carbonic acid, and 2 of water, (Kane.) It is permanent in the air; exposed to a strong heat it evaporates, leaving no residue if pure; it is soluble in eight parts of water at 60°; boiling water decomposes it, driving off part of its carbonic acid and ammonia. The solution in cold water is faintly alkaline.

THERAPEUTICAL EFFECTS.—This preparation, which has been retained in the last edition of the Dublin Pharmacopœia, is an excellent antacid, though not much used; it possesses the stimulating properties of ammonia or of the sesquicarbonate, but in a less degree, and being more agreeable to the taste is to be preferred in many cases. It also possesses the advantage of effervescing more freely in solution on the addition of an acid, which is of importance when ammonia is prescribed in any of the vegetable infusions or decoctions.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xxx. It may be given in *cold* aqueous vehicles, or in any of the bitter vegetable infusions or decoctions.

INCOMPATIBLES.—Same as for the sesquicarbonate of ammonia.

AMMONIÆ SESQUICARBONAS, D. L. AMMONIÆ CARBONAS. E.

Sesquicarbonate of Ammonia ; Carbonate of Ammonia.

PREPARATION.—An article of the Materia Medica in the Dublin and London Pharmacopœias. *Edinburgh.* "Take of sal-ammoniac, lbj. ; chalk, lbjss. ; reduce them separately to fine powder ; mix them thoroughly and subject the mixture, in a retort with a proper receiver, to a gradually-increasing heat so long as any vapours sublime."

PHYSICAL PROPERTIES.—A solid white salt, in semi-transparent fibrous cakes or fragments ; with a pungent ammoniacal odour, and a caustic alkaline taste. Specific gravity ·966.

CHEMICAL PROPERTIES.—It consists of 3 equivalents of carbonic acid, 2 of ammonia, and 2 of water ; or of 1 equivalent of the bicarbonate, and 1 of a simple carbonate which consists of 1 of amidogene, 1 of hydrogen, and 1 of carbonic acid, (Kane.) Exposed to the air it effloresces and soon falls to powder, neutral carbonate of ammonia being evolved ; the remaining powder is the bicarbonate : this change has been taken advantage of in the simple process of the Dublin College for obtaining that preparation. It is sublimed by heat, without any residuum if it be pure. It is soluble in four parts of water at 60°, but is decomposed by boiling water and by alcohol : the solution is highly alkaline ; turmeric paper, which has been rendered brown by it, recovers its yellow colour on exposure to the air.

ADULTERATIONS.—If this salt contains any fixed or insoluble impurity, it will not be entirely sublimed by heat nor completely soluble in water. Sometimes, owing to bad preparation, it contains hydrochlorate or sulphate of ammonia ; their presence is detected, the former by nitrate of silver, the latter by hydrochlorate or nitrate of baryta, causing a white precipitate in a solution of the salt, nitric acid having been previously added to saturation. Lead is also sometimes present in it from the same cause ; this may be at once detected by dissolving it in water, when the carbonate of lead falls down as an insoluble white precipitate. If it contains any empyreumatic oil, the solution in a dilute acid is dark coloured. Sesquicarbonate of ammonia is, however, generally met with of good quality at present. The London and Edinburgh Colleges propose the following tests for its purity :—*London.* "Colourless, translucent ; of an acrid smell and taste ; changes the colour of turmeric to brown ; dissipated by heat ; is soluble in water ; when saturated with nitric acid it does not precipitate with chloride of barium or nitrate of silver." *Edinburgh.* "Heat sublimes it entirely ; a solution in water with nitric acid in excess does not precipitate with solution of nitrate of baryta or nitrate of silver."

THERAPEUTICAL EFFECTS.—As an antacid, it may be employed in the same forms of dyspepsia as the solution of ammonia ; but where flatulence is present, the use of the carbonate is objectionable, owing to the carbonic acid which is set free in the stomach : its stimulant properties contraindicate its employment where there is any tendency to inflammation. Carbonate of ammonia is administered with much advantage in the lithic acid diathesis; and it has been used, it is stated, with much benefit in diabetes, but my own experience as well as that of more recent observers is not confirmatory of this statement. (See *Emetics* and *General Stimulants.*)

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. in pill, or in any *cold* aqueous vehicle. Gr. xxx. usually produces vomiting.

Liquor Ammoniæ sesquicarbonatis, L. *Ammoniæ carbonatis aqua*, E. (Dissolve ℥iv. of sesquicarbonate of ammonia in a pint of distilled water, and filter.) A convenient strength for use in medicine: Dose, min. xxx. to min. lx. properly diluted.

INCOMPATIBLES.—Acids; the fixed alkalies and their carbonates; bitartrate of potash; calcareous salts; and the salts of iron, zinc, lead, and mercury; but sulphate of magnesia is not incompatible with sesquicarbonate of ammonia.

CALCIS LIQUOR, D. L. CALCIS AQUA, E. *Lime Water.* (Syn. *Calcis aqua*, D.)

PREPARATION—*Dublin.* "Take of fresh-burned lime, two ounces; distilled water, half a gallon; having slaked the lime with an ounce and a half of the water, introduce it into a well-stopped bottle containing the remainder of the water, and shake well for the space of five minutes. After twelve hours the excess of lime will have subsided, and the clear lime-water may be drawn off with a syphon as it may be required. When the entire of the solution has been withdrawn, it may be renewed by shaking the sediment at the bottom of the bottle with another half gallon of water; and, if the lime be pure, and the bottle be accurately stopped, this process may be successfully repeated three or four times." *London.* "Lime, ℔ss.; distilled water, Oxij.; upon the lime first slaked with a little of the water pour the remainder of the water, and shake them together; then immediately cover the vessel and set it by for three hours; afterwards keep the solution with the remaining lime in stopped glass vessels; and when it is to be used, take from the clear solution." *Edinburgh.* "Take any convenient quantity of water; pour a little of it over about a twentieth of its weight of lime; when the lime is slaked, add it to the rest of the water in a bottle; agitate well; allow the undissolved matter to subside; pour off the the clear liquor when it is wanted, replacing it with more water, and agitating briskly as before."

PHYSICAL PROPERTIES.—A transparent, colourless liquid; odourless, but having a disagreeable, alkaline taste.

CHEMICAL PROPERTIES.—Lime is only sparingly soluble in water; requiring 732 parts of cold and about 1500 parts of boiling water for its solution (Wittstein), being therefore more soluble in cold than in hot water, so that a saturated solution, when boiled, deposits a hydrate of lime. Exposed to the air, lime-water absorbs carbonic acid, and becomes covered with a thin crust of carbonate of lime, it must consequently be kept for medical use in well stoppered bottles. According to M. Chevreul, lime-water if kept in white glass bottles for any length of time, dissolves an appreciable portion of the oxide of lead which usually enters into their composition; it should therefore be preserved in those made of green glass. It acts faintly alkaline on vegetable colours, gives white precipitates with carbonic and oxalic acids, but does not precipitate with sulphuric acid.

THERAPEUTICAL EFFECTS.—Lime-water is a useful antacid in those forms of dyspepsia which are characterized by great irritability of the stomach, accompanied by constant secretion of acid. In the United States Dispensatory, a diet almost exclusively of lime-water and new milk, in the proportion of one part of the former to two or three of the latter, is recommended as a very effectual plan of treatment in dyspepsia accompanied by vomiting of food, but in such cases I have found Carrara water (see page 8,) with milk much more efficacious. In the acidity of the stomach of the gouty and rheumatic diathesis, the alkaline antacids are usually preferred to lime, but the use of lime-water increases the urinary secretion and diminishes the tendency to the deposit of urates, indications of its therapeutical value in these diseases. Lime-water may be given as an antidote in poisoning with nitric, hydrochloric, or oxalic acids.

DOSE AND MODE OF ADMINISTRATION.—f℥j. to f℥iv. It is most conveniently administered in milk, which conceals its disagreeable taste; but as this addition would be injurious in many cases, it may be given alone. When lime-water has been administered for some time, its use should be occasionally intermitted.

INCOMPATIBLES.—The vegetable and mineral acids; alkaline and metallic salts; tartar emetic; and most vegetable infusions and decoctions, as those of calumba, cinchona bark, gentian, senna, rhubarb, sarsaparilla, etc.

CRETA PRÆPARATA, D. L. E. CALCIS CARBONAS PRÆCIPITATUM, D. *Prepared chalk. Precipitated carbonate of lime*, D. *Friable carbonate of lime reduced to the finest powder and elutriated*, L.

PREPARATION. An article of the materia medica in the London Pharmacopœia.—*Dublin.* "Take of chalk one pound; water, a sufficient quantity; reduce the chalk to a fine powder, and having triturated this in a large mortar with as much water as will give it the consistence of cream, fill the mortar with water, and stir well, giving the whole a circular motion. Allow the mixture to stand for fifteen seconds, and then decant the milky liquid into a large vessel. Triturate what remains in the mortar, adding as much water as was previously used, and, after allowing it to settle for fifteen seconds, again decant, and let this process be repeated several times. Let the fine sediment which subsides from the decanted liquids, be transferred to a calico filter, and dried at a temperature not exceeding 212°." *Edinburgh.* "Take any convenient quantity of chalk; triturate it well in a mortar with a little water; then pour it into a large vessel nearly full of water, and agitate briskly; allow it to rest for a short time, and pour the milky water into another vessel, in which the fine suspended chalk is to be left slowly to subside; repeat this process with the coarsely powdered chalk which subsided quickly in the first vessel; collect the fine powder in the second vessel on a filter of linen or calico, and dry it." *Calcis carbonas præcipitatum*, D.—"Take of chloride of calcium, ℥v.; crystals of commercial carbonate of soda, ℥xiij.;

boiling water, Oiv. ; dissolve each salt in a quart of the water, mix the two solutions, and when the precipitate has subsided, draw off the supernatant liquor. Transfer the sediment to a calico filter, and wash it with boiling hot distilled water, until the washings cease to give a precipitate with nitre of silver. Finally, dry the product at a temperature not exceeding 212°."

PHYSICAL PROPERTIES—Prepared chalk is usually in small conical masses, of a dull greyish-white colour, opaque and very friable ; the powder is soft and massive. It is odourless and tasteless, but adherent to the tongue. Specific gravity about 2·3. Precipitated carbonate of lime is a snow-white, fine powder.

CHEMICAL PROPERTIES.—It is composed of one equivalent of carbonic acid, and one of lime. It is permanent in the air ; exposed to a red heat it parts with its carbonic acid, and is converted into quicklime. It is miscible with, but is scarcely soluble in water, one part requiring about 1600 parts of cold, and 8834 parts of boiling water for its solution ; it dissolves in large quantity in water containing carbonic acid, from which, however, it is deposited on exposure to the air.

ADULTERATIONS.—Prepared chalk generally contains silica and alumina, and, from not having been sufficiently dried, moisture ; these impurities are best detected by the tests of the *Edinburgh Pharmacopœia*, which indicate the exact amount of pure carbonate of lime present :—"A solution of gr. xxv. in f℥x. of pyroligneous acid, when neutralized by carbonate of soda, and precipitated by gr. xxxij. of oxalate of ammonia, continues precipitable after filtration by more of the test." In the *London Pharmacopœia* the following tests are given :—" Almost entirely soluble in dilute hydrochloric acid, emitting bubbles of carbonic acid. This solution gives no precipitate with hydrosulphuric acid, nor, after it has been boiled, with ammonia or lime-water added in excess." Finely ground sulphate of lime is sometimes substituted for precipitated chalk ; the fraud may be readily detected by its insolubility in dilute hydrochloric acid.

THERAPEUTICAL EFFECTS.—Chalk is employed with much benefit as an antacid, in acidity of the digestive organs, especially when accompanied by diarrhœa, as is so frequently the case in infancy and childhood ; for this purpose it is advantageously combined with aromatics or with opium. It is an excellent antidote in poisoning with nitric, hydrochloric, or oxalic acids ; and is used with benefit as a desiccant in bed-sores, intertrigo, erysipelas and some forms of skin diseases when unattended with local inflammatory action. Precipitated carbonate of lime is not much employed in medicine, as it possesses but little advantage over prepared chalk, and is much more expensive ; its chief use is as an ingredient in tooth powders. Carbonate of lime dissolved in water by means of carbonic acid in excess constitutes an aerated solution of the bicarbonate, and is sold by venders of mineral waters under the name of *Carrara water*. This is a most useful and agreeable form for its administration, and when given mixed with an equal quantity of milk is productive of excellent effects in many forms of chronic dyspepsia, especially in those characterized by excessive secretion of air in the stomach, by regurgitation of food, and by vomiting; the quantity of bicarbonate of lime, however, held in solution is so small that its action as an antacid is but trifling. All preparations of lime are contraindicated in cases in which there is a tendency to phosphatic deposits in the urine.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒij. in powder or in mixture. The dose of *Carrara water* is from f℥ij. to f℥vj. three times a day.

Mistura Cretæ, D. L. E. ("Prepared chalk, ʒij. ; simple syrup, mucilage of gum arabic, of each, f℥ss. ; cinnamon water, f℥vij. rub the chalk with the cinnamon water, then add the syrup and mucilage, and mix ;" D.—"Prepared chalk, ℥ss. ; sugar ʒiij. ; mixture of acacia, f℥iss. ; cinnamon water, f℥xviij. ; mix ;" L.—"Prepared chalk, ʒx. ; pure sugar, ʒv. ; mucilage, f℥iij. ; spirit of cinnamon, f℥ij. ; water, Oij. ; triturate the chalk, sugar, and mucilage together ; and then add gradually the water and spirit of cinnamon ;" E.) Chiefly used in diarrhœa for its antacid properties, and as a vehicle for more active medicines. Dose, f℥j. to f℥ij.

Pulvis Cretæ compositus, D. L. E. ("Prepared chalk, ℥v. ; cinnamon, ℥ijss. ; gum-arabic, ℥ij. ; nutmeg, ℥ss. ; rub the ingredients separately to powder, then mix and pass through a fine sieve ;" D.—"Prepared chalk, ℔ss. ; cinnamon, ℥iv. ; tormentil root, and gum-arabic, of each, ℥iij. ; long pepper, ℥ss. ; rub them separately to fine powder, and then mix them ;" L.—"Prepared chalk, ℥iv. ; cinnamon, in fine powder, ʒjss. ; nutmeg, in fine powder, ʒj. ; triturate them well together ;" E.) Antacid and aromatic, principally employed in the diseases of children. Dose, gr. x. to gr. xxx.

Trochiscus Cretæ, E.—(Prepared chalk, ℥iv. ; gum arabic, ℥j. ; nutmeg, ʒj. ; pure sugar, ℥vj. ; reduce them to powder, and beat them with a little water into a proper mass for making lozenges.) Antacid and aromatic, used in acidity of the stomach ; Dose, ʒj. to ʒij.

INCOMPATIBLES.—Acids, and acidulous salts are incompatible with chalk and its preparations.

MAGNESIA, D. L. E. *Magnesia; Calcined Magnesia.*

PREPARATION.—*Dublin*—"Carbonate of magnesia, any convenient quantity : introduce it into a clay crucible, closed loosely by a lid, and let this be exposed to a low red heat as long as a little of the magnesia, taken from the central part of the crucible, when cooled and dropped into dilute sulphuric acid, continues to give rise to effervescence. Let the product be preserved in well-closed bottles." *London*—"Carbonate of magnesia, ℔j. burn it for two hours in a very strong fire." *Edinburgh*—"Expose any convenient quantity of carbonate of magnesia in a crucible to a full red heat, for two hours, or till the powder, when suspended in water, presents no effervescence on the addition of muriatic acid ; preserve the product in well-closed bottles."

PHYSICAL PROPERTIES.—A very light, soft powder, perfectly white, odourless and tasteless, slightly adherent to the tongue Specific gravity about 2·3.

CHEMICAL PROPERTIES.—Magnesia consists of one equivalent of the metal magnesium, and one of oxygen. Exposed to the air it absorbs carbonic acid and moisture; it is highly infusible; and is very slightly soluble in water, requiring 5142 times its weight of water at 60° for its solution: like lime, it is more soluble in cold than in hot water. When moistened it acts feebly alkaline on vegetable colours.

ADULTERATIONS.—Magnesia generally contains some carbonate, either from faulty preparation or bad keeping; the presence of which is indicated by effervescence being caused on the addition of any dilute mineral acid. It is frequently adulterated with lime, silica, and alumina. If it contains silica, it will not dissolve completely in dilute hydrochloric acid; if alumina is present, the solution in the dilute acid precipitates with excess of ammonia; and if lime is present, solution of oxalate of ammonia or of the bicarbonate of potash gives a white precipitate, with the solution in the dilute acid. Sulphate of magnesia sometimes exists in it; this is detected by solution of chloride of barium giving a white precipitate with the solution in hydrochloric acid. Magnesia is occasionally made to absorb water in order fraudulently to increase its weight, which may be thus augmented from 17 to even 40 per cent; this fraud may be detected by the loss of weight which occurs on exposure to a red heat. Chevallier states that in one instance he found it adulterated with flour, a sophistication readily detected by its not being completely soluble in dilute hydrochloric acid.

THERAPEUTICAL EFFECTS.—As an antacid magnesia is employed in dyspepsia, attended with acidity of the stomach and with constipation; in such cases it is generally preferred to the alkalies, as being less irritant, and as the combinations which it forms with the free acids of the stomach are gently laxative. In gastrodynia and heartburn, given in combination with some aromatic, a short time before the meals, it seldom fails to prove beneficial. It is also administered with much advantage in the acidity attendant on infantile diseases; in that of persons of a gouty and rheumatic diathesis, as it diminishes the quantity of uric acid in the urine; and in lithiasis. Magnesia is also used as an antidote in poisoning with the mineral acids, but its employment in such cases is objectionable, for during its combination with the acids, a degree of heat sufficient to destroy the mucous membrane of the stomach is produced. In poisoning with arsenic it proves an efficacious antidote, for which purpose it should be administered suspended in water. (See *Cathartics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx. twice or three times daily. It may be given suspended in milk, or in some aromatic water.

INCOMPATIBLES.—Acids; acidulous salts; metallic salts; and hydrochlorate of ammonia.

MAGNESIÆ CARBONAS, D. L. E. MAGNESIÆ CARBONAS PONDEROSUM, D. *Carbonate of Magnesia. Heavy Carbonate of Magnesia. Magnesia Alba.*

PREPARATION.—*Dublin.*—" Sulphate of magnesia of commerce, ten ounces ; crystallized carbonate of soda of commerce, twelve ounces ; distilled water, a sufficient quantity : dissolve each salt in two quarts of water, mix the two solutions cold, and boil the mixture for ten minutes. Transfer the precipitate to a calico filter, and pour upon it, repeatedly, boiling water, until the washings cease to give a precipitate with a solution of nitrate of barytes. Lastly, dry by a heat not exceeding 212°." *London.*—" Take of sulphate of magnesia, ℔iv. ; carbonate of soda, ℔iv. ℥ix. ; distilled water, boiling, cong. iv. ; dissolve the carbonate and sulphate separately, each in two gallons of the water, and strain ; then mix and boil the liquors, stirring constantly with a spatula for two hours, distilled water being frequently added, so that it may fill about the same measure. Lastly, the liquor being poured off, wash the precipitate with boiling distilled water, and dry it." *Edinburgh.*—" Take of sulphate of magnesia, ℔iv. ; carbonate of soda, ℔iv. ℥viij. ; water, four gallons ; dissolve the salts separately, each in two gallons of the water ; mix the solutions, boil the mixture, and stir briskly for fifteen or twenty minutes. Collect the precipitate on a filter of calico or linen, wash it thoroughly with boiling water, and then dry it." *Magnesiæ carbonas ponderosum*, D. " Sulphate of magnesia of commerce, ten ounces ; crystallized carbonate of soda of commerce, twelve ounces ; boiling distilled water, a sufficient quantity : dissolve the sulphate of magnesia in half a pint, and the carbonate of soda in a pint of the water, mix the two solutions, and evaporate the whole to dryness by means of a sand heat. Digest the residue for half an hour with one quart of boiling distilled water, and having collected the insoluble matter on a calico filter, treat it repeatedly with warm distilled water, until the washings cease to give a precipitate when suffered to drop into a solution of nitrate of barytes. Finally, dry the product at a heat not exceeding 212°."

PHYSICAL PROPERTIES.—A very white powder, light and bulky ; inodorous and tasteless, varying in density, two sorts being commonly met with ; the one very light, and either in very fine powder or in small cubical cakes *(light magnesia ;)* the other dense, and somewhat granular *(heavy magnesia.)* Both are officinal in the Dublin Pharmacopœia; the specific gravity of the latter is greater than that of the former in the proportion of about 3 to 1.

CHEMICAL PROPERTIES.—According to Berzelius, it is a compound of hydrate of magnesia with hydrated carbonate of magnesia, consisting of 3 equivalents of carbonic acid, 4 equivalents of magnesia, and 4 equivalents of water. It is permanent in the air ; exposed to a strong red heat it parts with its water and carbonic acid, magnesia being left. It is very sparingly soluble in water, requiring 2493 parts of cold, and 9000 of hot water for its solution ; but water charged with carbonic acid gas dissolves it, in the proportion of about 20 grains to the ounce. It is soluble with effervescence in acids. It acts, on vegetable colours, feebly alkaline.

ADULTERATIONS.—They are nearly similar to those of calcined magnesia, and are to be detected by the same tests. It may contain sulphate of soda from being imperfectly washed, when the solution in dilute nitric acid will give a white precipitate with chloride of barium. If it contains iron a blue precipitate will be produced in the same solution by ferrocyanide of potassium.

THERAPEUTICAL EFFECTS.—Carbonate of magnesia is employed as an absorbent and antacid in the same cases as magnesia; but owing to the carbonic acid which is disengaged in the stomach when it meets with the acids naturally present in that viscus, its use is objectionable in many cases. The light and heavy carbonates of magnesia precisely similar in chemical composition appear to have an analogous therapeutical action ; but from a fancied idea of superiority as regards certainty and mildness of effect the latter is preferred by many practitioners. Formulæ for preparing both have therefore been judiciously introduced into the last edition of the Dublin Pharmacopœia. (See also *Cathartics.*)

DOSE AND MODE OF ADMINISTRATION.—Gr. xv. to ʒss., it may be administered suspended in milk, or in some aromatic water. The most convenient form, however, for the exhibition of the carbonate of magnesia, is the solution in carbonated water, which was first introduced to the notice of the profession by Sir James Murray of this city ; and is still manufactured very extensively on his original plan, and also according to the method of the late Mr. Dinneford, both being in general very excellent preparations. It is prepared by exposing distilled water, in which very pure carbonate of magnesia is suspended (in the proportion of from 13 to 20 grains of the latter to every fluid ounce of the former) to a stream of carbonic acid gas forced into it by means of steam power, until a complete solution is formed. It then constitutes *Aqua Magnesiæ bicarbonatis*, and is given as an antacid in doses of fʒss. to f℥iss. This preparation, as prepared by different makers, is very liable to vary in strength, and in some instances, a solution of sulphate of soda is substituted for it. By the following simple method, proposed by Mr. Redwood of London, the precise quantity of carbonate of magnesia contained in it may be readily ascertained :—Evaporate a fluid ounce of the solution to dryness in a wedgewood dish ; calcine the residue at a red heat for about five or ten minutes, in a small Berlin crucible ; then weigh the calcined residue. If this residue be pure calcined magnesia, every five grains of it will be equivalent to twelve grains of the hydrated carbonate of magnesia of commerce ; after weighing the calcined residue, treat it with distilled water, when, if there are any soluble salts present, they will be dissolved out and may be tested, weighed, and the amount deducted from the weight of the magnesia.

Trochisci Magnesiæ, E. (Carbonate of magnesia, ℥vj. ; pure sugar, ℥iij. ; nutmeg, ℈j. ; beat them in powder, with mucilage of tragacanth, to a mass for lozenges.) In acidity of the stomach, *ad libitum.*

INCOMPATIBLES.—Acids ; acidulous, and metallic salts ; hydrochlorate of ammonia ; and lime water.

POTASSÆ CAUSTICÆ LIQUOR, D. LIQUOR POTASSÆ, L. POTASSÆ AQUA, E. *Water of caustic potash; Solution of Potash.* (Syn. *Potassœ aqua causticœ,* D.)

PREPARATION.—*Dublin*—"Pure carbonate of potash, one pound; fresh-burned lime, ten ounces; distilled water, one gallon and seven ounces; slake the lime with seven ounces of the water. Dissolve the carbonate of potash in the remainder of the water, and having raised the solution to the boiling point, in a clean iron vessel, gradually mix with it the slaked lime, and continue the ebullition for ten minutes, with constant stirring. Remove the vessel now from the fire, and when, by the subsidence of the insoluble matters, the supernatant liquor has become perfectly clear, transfer it by means of a syphon to a green glass bottle, furnished with an air-tight stopper." *London*—Carbonate of potash, ℥xv.; lime, ℥viij.; boiling distilled water, cong. j.; dissolve the carbonate of potash in half a gallon of the water; sprinkle a little of the water upon the lime, in an earthen vessel, and the lime being slaked, add the rest of the water. The liquors being immediately mixed together in a close vessel, shake them frequently until they are cold; then set aside, that the carbonate of lime may subside. Lastly, keep the supernatant liquor, when poured off, in a well stopped green-glass bottle. *Edinburgh.*—"Carbonate of potash (dry), ℥iv.; lime, recently burned, ℥ij.; water, f℥xlv.; let the lime be slaked, and converted into milk of lime with f℥vij. of the water; dissolve the carbonate in the rest of the water; boil the solution, and add the milk of lime in successive portions, about an eighth at a time—boiling briskly for a few minutes after each addition. Pour the whole into a deep narrow glass vessel for 24 hours, and then withdraw with a syphon the clear liquid, which ought to amount to at least f℥xxx. and should have a density of 1·072." As solution of potash corrodes flint glass it is directed in the pharmacopœias to be kept in green glass bottles.

PHYSICAL PROPERTIES.—A transparent colourless liquid, with an oily appearance, and a soapy feel; it is odourless, but has an intensely acrid alkaline taste. Its specific gravity is different in the three British Pharmacopœias; that of the Dublin preparation is 1·068, that of the London, 1·063, and that of Edinburgh, 1·072.

CHEMICAL PROPERTIES.—A solution of caustic potash in water. Exposed to the air it absorbs carbonic acid rapidly, and is converted into a solution of the carbonate of potash. By heat the water is driven off, but no further change takes place. It re-acts on vegetable colours powerfully alkaline. Solution of potash converts most oils and fats into soap. It does not effervesce with acids, but combines with them, forming salts.

ADULTERATIONS.—Solution of potash as kept in the shops is frequently too weak; this is known by its not being of the density prescribed by the colleges. If it contains any carbonate, it will effervesce on the addition of a dilute acid, and give a white precipitate with lime water. A white precipitate, caused by carbonate of soda, in the solution neutralized with dilute nitric acid, indicates the presence of lime. The following are the tests of the London College:—"One hundred grains contain 6·7 of potash. No precipitate or almost none is occasioned in the solution on the addition of lime water, or, if previously saturated with nitric acid, of carbonate of soda, of chloride of barium, or of nitrate of silver. Bichloride of platinum occasions a yellowish precipitate in it."

THERAPEUTICAL EFFECTS.—In dyspepsia attended with acid eructations, cardialgia, and gastrodynia, solution of potash is employed with much benefit, and especially in those derangements of the digestive organs consequent on excessive indulgence in spirituous liquors. It not only neutralizes the free acid, but also counteracts the morbid tendency of the stomach to acid secretion ; it must, however, be remembered that its action is only temporary, and that its continuous use deranges digestion and produces a tendency to acid secretion. Its beneficial action is often manifested in various forms of chronic cutaneous diseases when they are dependent on or connected with acidity of the digestive organs ; in which cases it should be preferred to the other remedies of this class. In the acidity of the stomach of the gouty and rheumatic, and in deposits of lithic acid or the lithates in the urine, solution of potash is also administered with much advantage, In scrofulous affections of the testis and in many forms of external tubercular disease, the internal use of this remedy is in general productive of excellent effects. Potash and its salts are rapidly absorbed from the stomach and pass into the blood, the alkalinity of which fluid they augment, and by rendering the fibrine more soluble tend to prevent its deposition, both of which effects serve as indications for its therapeutical employment. Solution of potash, when taken for some time, diminishes nutrition and promotes the absorption of fat which may have accumulated or been deposited ; it thus proves the most beneficial remedy in *fatty* diseases and is productive of excellent effects in preventing or removing the adipose condition of the body to which some persons are liable, for these purposes I have repeatedly used it with the most satisfactory results. The effects of solution of potash on the system generally but more especially on the urine have been very carefully and ably investigated by Dr. Parkes of London. (*British and Foreign Medico-Chirurgical Review,* Vol. XI. page 258.)

DOSE AND MODE OF ADMINISTRATION.—Min. x. gradually increased to fʒj. or fʒij. ; it should be largely diluted. Fresh table beer, or veal broth, partly conceals its nauseous taste, and consequently either may be employed as a vehicle for its administration. The combination with some aromatic bitter, as gentian, cascarilla, or calumba, is generally found very beneficial.

Brandish's alkaline solution. (Best American Pearlashes, ℔ij. ; quicklime, recently burned ; and wood ashes from the ash, of each, ℔ij. ; boiling water, cong. vj. ; add first the lime, then the pearlashes, and afterwards the wood ashes to the boiling water ; mix, and in 24 hours draw off the clear liquor ; to every pint of which, add of oil of juniper, min. ij.) This solution has a less disagreeable taste than the officinal *liquor potassæ,* and is therefore often substituted for it ; it is, however, very liable to vary in strength Dose, fʒss. to fʒij.

INCOMPATIBLES.—Acids ; acidulous and metallic salts ; and the preparation of ammonia.

In cases of poisoning with solution of potash, the best antidotes are vinegar, lemon juice, and the fixed oils.

POTASSÆ BICARBONAS, D. L. E. *Bicarbonate of Potash.*

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin.*—"Carbonate of potash from pearlash, one pound; distilled water one quart; muriatic acid of commerce, one pint and a-half; water, three pints; chalk in small fragments, one pound, or a sufficient quantity: dilute the muriatic acid with the water, and having dissolved the carbonate of potash in the distilled water, filter the solution into a three-pint bottle capable of being tightly closed by a cork, traversed by a glass tube sufficiently long to pass to the bottom of the solution. A second bottle, in the bottom of which a few holes are drilled, and the mouth of which admits of being closed by a cork, also traversed by a glass tube, having been filled with the chalk, and placed in a glass or porcelain jar of the same height with itself, but of somewhat larger diameter, the exterior ends of the two tubes are to be connected air-tight by a tube of vulcanized Indian rubber. The cork of the bottle containing the carbonate of potash, being placed loosely, and that of the other bottle tightly, in its place, and the muriatic acid having been poured into the jar in which is lodged the perforated bottle containing the chalk, the liberation of carbonic acid commences, and as soon as it is judged that a sufficient amount of it has been developed, to expel completely the air from the apparatus, the cork of the carbonate of potash bottle is to be forced into it quite tight, and the process is to be abandoned to itself for a week. At the end of this time numerous crystals of the bicarbonate of potash will have formed, which are to be removed, shaken in a capsule with twice their bulk of cold water, which is to be rapidly decanted, next drained, and finally dried on bibulous paper by mere exposure to the atmosphere. The mother liquor, if filtered, and concentrated to one-half, at a temperature not exceeding 110°, will yield additional crystals. The tube immersed in the solution of carbonate of potash will have to be occasionally cleared of the crystals with which it is liable to become plugged, else the process will be suspended." *Edinburgh.*—"Carbonate of potash, ℥vj.; carbonate of ammonia, ℥iiiss.; triturate the carbonate of ammonia to fine powder; mix with it the carbonate of potash; triturate them thoroughly together, adding by degrees a very little water, till a smooth and uniform pulp be formed. Dry this gradually at a temperature not exceeding 140°, triturating occasionally towards the close; and continue the dessication, till a fine powder be obtained, entirely free of ammoniacal odour."

PHYSICAL PROPERTIES.—This salt occurs in transparent colourless crystals, the primary form of which is a right oblique-angled prism. It is inodorous, but has a mildly alkaline taste, without any acridity.

CHEMICAL PROPERTIES.—Bicarbonate of potash is composed of 1 equivalent of potash, 2 of carbonic acid, and 1 of water. It is permanent in the air; exposed to a moderate heat, part of the carbonic acid is driven off, and it is reduced to the state of carbonate. It is soluble in four parts of water at 60°, and in less than its own weight of boiling water, by which, however, a portion of its acid is driven off; the solution is feebly alkaline. It is insoluble in alchohol.

ADULTERATIONS.—Bicarbonate of potash frequently contains carbonate of potash, from not having been sufficiently saturated with carbonic acid gas during the preparation; this is best detected by the action of solution of corrosive sublimate on a solution in 40 parts of water; if the salt contains even a trace of the carbonate, a brick-red precipitate will be produced. If any sulphates or chlorides are present, a solution supersaturated with nitric acid is precipitated white, with solution of hydrochlorate or nitrate of baryta if the impurity is a sulphate, and with solution of nitrate of silver if it contains a chloride.

THERAPEUTICAL EFFECTS.—Bicarbonate of potash may be administered as an antacid in the same cases as solution of caustic potash, its operation being similar, but it is less irritating than and not so powerful as that preparation; it acts, however, more decidedly on the kidneys, increasing the secretion of urine, especially when taken in the form of the effervescing solution. It possesses the advantage, also, of being less unpleasant to the taste; and its employment may be continued without interruption for a longer period.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx., two or three times a day; it may be given dissolved in some aromatic water.

Potassæ aqua effervescens, E. *Kali water.* (Bicarbonate of potash, ʒj.; distilled water, Oj.; dissolve the salt in the water, and transmit through the solution carbonic acid under strong pressure.) An excellent and agreeable form for the administration of this salt, which, however, as being invariably prepared by the manufacturers of mineral waters, has been omitted from the last edition of the London Pharmacopœia. Dose, f℥ij. to f℥viij. three times a day.

INCOMPATIBLES.—Acids; acetate and hydrochlorate of ammonia; lime water; and most of the metallic salts, but not sulphate of magnesia.

POTASSÆ CARBONAS E LIXIVO CINERE, D. POTASSÆ CARBONAS L. E. *Carbonate of potash, (prepared from potashes,* D. E.)

LIXIVUS CINIS, D. *Impure carbonate of potash; Pearlashes; Potashes.*

POTASSÆ CARBONAS PURUM, D. E. *Pure Carbonate of potash. Carbonate of potash prepared from crystals of tartar.* (Syn. *Potassæ carbonas e tartari crystallis,* D.)

Pearlashes or potashes are procured by lixiviation from the ashes of many trees and land plants. They are imported in large deliquescent masses of a dirty bluish white colour, packed in barrels, and are principally brought from America, where they are prepared in very large quantity from the trees cut down in the clearing of land: purified by any of the processes mentioned below, they are converted into pure carbonate of potash.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. CARBONATE OF POTASH FROM POTASHES.—*Dublin.*—"Pearlash, ten pounds; distilled water, one gallon; pour the water on the pearlash, and macerate for a week, occasionally stirring the mixture. Filter through calico, and having evaporated the solution nearly to dryness, reduce the heat, and stir constantly with an iron rod, until granular crystals are obtained. Let these be immediately enclosed in well-stopped bottles." *Edinburgh.*—"Obtained from the potashes of commerce by lixiviating, evaporating, and granulating, by fusion and refrigeration." PURE CARBONATE OF POTASH.—*Dublin.*—"White bitartrate of potash, two pounds; sesquicarbonate of ammonia, half an ounce; distilled water, three pints; place the bitartrate of potash in an iron pot or crucible, and, constantly stirring it with an iron rod, expose it to a red heat until vapours cease to be evolved. Reduce the residuum to a coarse powder, and, having boiled it for twenty minutes with one quart of the water, filter through paper, washing the filter and its contents with the residual pint of water, in which the sesquicarbonate of ammonia has been first dissolved. The filtered solution is now to be evaporated to dryness, and, a low red heat being finally applied, the product is to be rapidly reduced to powder in a warm mortar, and enclosed in well-stopped bottles." *Edinburgh.*—"Most readily obtained by heating crystallized bicarbonate of potash to redness in a crucible; but more cheaply by dissolving bitartrate of potash in 30 parts of boiling water, separating and washing the crystals, which form on cooling, heating these in a loosely-covered crucible to redness, so long as fumes are discharged, breaking down the mass and roasting it in an open crucible for two hours, with occasional stirring, lixiviating the product with distilled water, filtering the solution thus obtained, evaporating the solution to dryness, granulating the salt towards the close by brisk agitation, and heating the granular salt nearly to redness. The product of either process must be kept in well-closed vessels."

PHYSICAL PROPERTIES.—Carbonate of potash is met with in the form of coarse, white, crystalline grains, inodorous, with an acrid alkaline taste. When crystallized, which, however, it is difficult to effect, the crystals are rhombic octohedrons.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potash, and 1 of carbonic acid, combined in the crystals with 2 equivalents of water; as met with in the shops in the granular state, it is generally a sesquihydrate containing about 16 per cent. of water. It attracts moisture, deliquescing rapidly and becoming liquid, but as it slowly absorbs carbonic acid from the air it again gradually becomes dry. By a red heat it is fused, but is not decomposed. It is soluble in less than its own weight of water at 60°, but is insoluble in alcohol. It is highly alkaline, but not caustic.

ADULTERATIONS.—As commonly met with in commerce, carbonate of potash contains much water; the quantity present may be known by the loss of weight which the salt suffers when exposed to a red heat; in the *London Pharmacopœia*, it is stated, that this should not be more than 16 per cent.; in the *Edinburgh*, 20 per cent. The presence of sulphates or chlorides may be detected by the same tests as given under the head of bicarbonate of potash. Silica, which is occasionally present in carbonate of potash, may be detected by nitric acid, when added to saturation, causing a cloudy precipitate in a solution in water.

THERAPEUTICAL EFFECTS.—As an antacid it may be employed in the same cases as the bicarbonate, but in consequence of its unpleasant taste, and irritant, even poisonous, properties, it is not much used in medicine. The external application of preparations containing the alkalies has been highly recommended by Devergie, for the treatment of many obstinate cutaneous affections; I have used solutions and ointments containing the alkaline carbonates and bicarbonates with excellent effect in the treatment of many diseases of the skin, particularly in some forms of papular, vesicular and pustular eruptions, especially in those seated on the scalp.* But although I sometimes use the carbonate of potash when the disease is very chronic, or of a non-inflammatory character, as in porrigo capitis, its acridity forbids its general employment. In pharmacy, carbonate of potash is employed for the preparation of caustic potash, the bicarbonate, &c.

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* See the Author's Treatise on Diseases of the Skin, Dublin, 1852.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. largely diluted; for external use, half a drachm to a drachm may be dissolved in a pint of distilled water, or made into an ointment with an ounce of prepared lard or white wax ointment.

Potassæ Carbonatis liquor, D. L. ("Take of pure carbonate of potash, ℥x. ; distilled water, Oj. ; dissolve and filter. The specific gravity of this solution is 1·310." D. "Carbonate of potash, ℥xx. ; distilled water, Oj. ; dissolve and filter. The specific gravity of this solution is 1·473." L.) A convenient strength for internal use ; the London preparation contains twice as much of the salt as that of Dublin, in every fluid ounce of which there is half an ounce of carbonate of potash. Dose of the latter, min. x. to fℨj. in milk or in some aromatic water.

INCOMPATIBLES.—Same as the bicarbonate ; but sulphate of magnesia is decomposed by the carbonate. In cases of poisoning with this salt, the antidotes are the same as those for solution of potash.

SODÆ BICARBONAS, D. L. E. *Bicarbonate of soda.*

PREPARATION.—An article of the Materia Medica in the London Pharmacopœia ; in the former edition of which it was termed the *Sesquicarbonate*. *Dublin*—"Crystallized carbonate of soda of commerce, two pounds ; distilled water, one quart ; muriatic acid of commerce, one pint and a half ; water, three pints ; chalk, in fragments, one pound, or a sufficient quantity : having diluted the muriatic acid with the water, and dissolved the carbonate of soda in the distilled water, manipulate with these solutions, and with the chalk, as directed in the formula for Potassæ Bicarbonas, employing also the arrangement of apparatus there described. With the view, however, of obtaining from the mother liquor an additional quantity of bicarbonate, it is not necessary that the evaporation shall be preceded by filtration." *Edinburgh*.—"Fill with fragments of marble a glass jar, open at the bottom, and tubulated at the top ; close the bottom in such a way as to keep in the marble without preventing the free passage of a fluid ; connect the tubulature closely by a bent tube and corks with an empty bottle, and this in like manner with another bottle filled with one part of carbonate of soda, and two parts of dried carbonate of soda, well triturated together ; and let the tube be long enough to reach the bottom of the bottle. Before closing the last cork closely, immerse the jar to the top in diluted muriatic acid, contained in any convenient vessel ; when the whole apparatus is thus filled with carbonic acid gas, secure the last cork tightly ; and let the action go on till next morning, or till gas is no longer absorbed by the salt. Remove the damp salt which is formed, and dry it either in the air without heat, or at a temperature not above 120°."

PHYSICAL PROPERTIES.—Usually in the form of a fine, white powder, but sometimes met with in small indistinct crystals of the rectangular prism series ; it is inodorous, but has a mild alkaline taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, two of carbonic acid, and one of water. It is permanent in the air; by a moderate heat, the water and one equivalent of carbonic acid are expelled, and it is reduced to the state of carbonate. It requires 13 parts of water at 60° for its solution, but a much less quantity of boiling water ; in the latter it loses one-fourth of its acid, and becomes the sesquicarbonate ; prolonged boiling converts it into the state of carbonate. The solution is faintly alkaline ; it effervesces with acids, but does not precipitate with the salts of magnesia.

ADULTERATIONS.—The only adulteration of importance is with the simple or monocarbonate, and this is seldom wanting ; it may be readily detected by the action of solution of corrosive sublimate, which gives a reddish-brown precipitate with a solution of the bicarbonate in 40 parts of distilled water, if it contains so much as a hundredth part of the carbonate; this is the test of the Edinburgh College; that of London is as follows :—100 grains of the salt added to diluted sulphuric acid evolve 51·7 grains of carbonic acid.

THERAPEUTICAL EFFECTS.—In the various forms of dyspepsia attended with secretion of acid and vomiting, no remedy is so frequently employed as the bicarbonate of soda, being usually taken in solution with excess of carbonic acid. In lithiasis, and in gout and rheumatism where there is excessive secretion of uric acid and the urates, the potash preparations should be preferred to it, for the salt formed with soda and uric acid is extremely insoluble, being in fact the compound which is deposited in the joints of persons who suffer from repeated attacks of gout. Its use is highly injurious when there are phosphatic deposits in the urine. At page 17, I have referred to the employment of the alkaline carbonates and bicarbonates in the treatment of skin diseases ; I have chiefly used the bicarbonate of soda in the form of ointment made with the simple cerate of the London or Edinburgh Pharmacopœia, with cold cream or with cucumber cerate, as greasy unguents are in many instances productive of mischief in eruptions of the skin, more especially when they are seated on the scalp.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. dissolved in water. For external application, from twenty to thirty grains of the bicarbonate of soda may be made into an ointment, with an ounce of cerate or cold cream.

Aqua Sodæ effervescens, E. (Bicarbonate of soda, ʒj. ; water Oj. ; dissolve the bicarbonate in the water, and saturate it with carbonic acid under strong pressure. Preserve the liquid in well closed vessels). This constitutes *Soda water*, the form in which the bicarbonate is most generally used ; as met with in the shops, however, soda water is seldom anything more than a simple solution of carbonic acid in water, not containing any carbonate of soda; this may be easily known by adding some weak acid to the solution, as soon as it has ceased to effervesce after being poured from the bottle, when no further effervescence will take place, unless the alkaline carbonate be present. Dose, f℥vj. to f℥viij. two or three times a-day. Being usually prepared on the large scale by mineral water venders, it has been properly omitted from the last edition of the London Pharmacopœia.

Trochisci Sodæ bicarbonatis, E. (Bicarbonate of soda, ℥j. ; pure sugar, ℥iij. ; gum-arabic, ʒss. ; pulverize them ; and with mucilage beat them into a proper mass for making lozenges). In acidity of the stomach, *ad libitum.*

INCOMPATIBLES.—Acids; lime-water; hydrochlorate of ammonia; and metallic salts, except those of magnesia.

SODÆ CARBONAS CRYSTALLIZATUM, D. SODÆ CARBONAS, L. E. *Carbonate of soda.*

Impure carbonate of soda or barilla is obtained by burning to ashes several terrestrial plants which belong to the natural family *Chenopodiaceæ,* and which usually grow on the sea-shore. It is imported in the form of hard greyish-blue masses not deliquescent, packed in barrels; being chiefly brought from Sicily, Teneriffe and the Canary Islands, and the East Indies. It is only employed for yielding carbonate of soda. In the present day, however, carbonate of soda is prepared on the large scale from common sea-salt by a complicated process, the details of which will be found in all modern works on chemistry, and it has consequently been introduced as an article of the materia medica into the last editions of the three British pharmacopœias.

PHYSICAL PROPERTIES.—Carbonate of soda occurs in large, transparent crystals, or fragments of crystals, the primary form of which is an oblique rhombic prism. They are inodorous; but have a disagreeable, alkaline, somewhat caustic taste. Specific gravity, 1·42.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, one of carbonic acid, and ten of water. It effloresces when exposed to the air; by heat it is fused in its water of crystallization, which is expelled, and a white anhydrous salt left, which again becomes liquid at a red heat, but is not decomposed. The crystals are soluble in twice their weight of water at 60°, and in their water of crystallization at 212°; they are insoluble in alcohol. The solution is powerfully alkaline.

ADULTERATIONS.—The impurities usually met with in carbonate of soda are sulphates and chlorides; they may be detected in the manner indicated when these adulterations are present in carbonate of potash.

THERAPEUTICAL EFFECTS.—Carbonate of soda is not employed as an antacid so frequently as the bicarbonate, in consequence of its disagreeable taste; but it is very generally used in the dried state as an alterative in the diseases of infancy and childhood. In the treatment of the eruptive diseases of the skin already referred to (page 17,) given internally, and applied externally in the forms of ointment, liniment, or lotion, its employment is productive of the best results. I have for several years used it very extensively both in hospital and private practice in the treatment of impetigo, of herpes, and the dry form of eczema of the scalp, and have generally found it to effect a cure of these ordinarily intractable affections. In large doses carbonate of soda is corrosive and irritant, and may thus produce symptoms of poisoning by its local action on the mucous membrane of the stomach ; the best antidotes are fixed oil and the vegetable acids.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. dissolved in water ; for external application from ʒss. to ʒij. may be dissolved in a pint of water, or an ointment prepared with from gr. x. to gr. xx. to the ounce of cerate or cold cream.

Sodæ carbonas siccatum, D. E. *Sodæ carbonas exsiccata,* L. (" Crystallized carbonate of soda of commerce, any convenient quantity : expose it in a porcelain capsule to a pretty strong sand heat, until the liquid which first forms is converted into a dry cake, and having rubbed this to powder, enclose it in a bottle," D. " Expose a pound of carbonate of soda to heat until the crystals fall to powder, then burn to redness, and finally reduce to powder," L. " Heat any convenient quantity of carbonate of soda in a shallow vessel till it is dry ; then urge it with a red heat in a crucible, and reduce it to powder when cold," E.) Thus deprived of its water of crystallization, carbonate of soda may be given in the form of powder or pill ; it has a very caustic taste, and therefore when given in powder, especially if to children, should be combined with some bland substance, as sugar of milk, or gum tragacanth, to conceal its acrimony. Fifty-four grains of the dried carbonate of soda are equal to 144 grains of the crystallized salt. Dose, gr. v. to gr. xx.

Sodæ carbonatis liquor, D. (Crystallized carbonate of soda of commerce, ℥jss. ; distilled water, Oj. ; dissolve and filter ; the specific gravity of this solution is 1·026.) Each fluid ounce contains nearly 36 grains of crystallized carbonate of soda.

INCOMPATIBLES.—Acids, and their salts ; lime-water ; and magnesia.

CHAPTER II.

ANTHELMINTICS.

(Vermifuges.)

ANTHELMINTICS are remedies which possess the property of destroying intestinal worms, or of expelling them from the digestive canal. Besides the specific or more immediate anthelmintics, which alone are described in this chapter, many of the more active cathartics effect this purpose; and they should be always administered in conjunction with, or shortly after the specific remedies, the efficacy of which they tend much to increase. As the action of these remedies, however, is merely temporary, it will be requisite, as soon as the worms are expelled, to employ means calculated to restore the digestive organs to a healthy state, and to correct that peculiar condition of them which promotes the generation of intestinal worms. The means best calculated for this purpose are:—keeping the surface of the body warm by proper clothing, a light but nutritious diet with a moderate use of common salt, and at the same time the administration of bitter tonics with gentle aperients, and, if anemia be present, the preparations of iron. The recent valuable and important investigations of Küchenmeister have proved that intestinal parasites are most probably generally developed in man from ova existing in the flesh of the lower animals when taken as food; and from this fact may be derived at least one most important indication for their prevention in those who have suffered from them, namely, that such persons should never use meat which has not been thoroughly cooked, and also that the flesh of the pig should not in any form constitute part of their diet. In children especially, the presence of worms in the intestinal canal is very apt to produce various spasmodic and nervous diseases which simulate epilepsy, chorea, hysteria, &c.; in such cases antispasmodics are advantageously combined with vermifuges, and their use for some time after the worms have been expelled is absolutely requisite, as the habit, so to say, acquired by the system is with difficulty got rid of; for the removal of nervous affections thus caused, I have found the cold salt water shower bath, with the internal administration of valerianate of zinc, very efficacious. The administration of anthelmintics should be continued in all cases for a long time, even for weeks, after all traces of the parasites have ceased to appear in the stools, as the ova may remain for a lengthened period in the intestinal canal before being developed into worms.

ABSINTHIUM, L. E. *Wormwood. The herb* (*in flower* L.) *of Artemisia absinthium.* Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ,* Lindley), and to the Linnæan class and order *Syngenesia Superflua.*

BOTANICAL CHARACTERS.—An undershrub, 1–1½ foot high, erect, covered with silky hoariness; Leaves, bipinnatifid, downy, segments lanceolate; Flowers in erect leafy panicles, hemispherical, drooping, large, dingy yellow.

PROPERTIES.—The whole plant is aromatic and bitter with a strong disagreeable odour. Its most important constituents are, absinthine, extractive, resin, and a green volatile oil; it yields its properties to both water and alcohol. Absinthine is a semi-crystalline mass, soluble in alcohol, and having a very bitter taste. The herb, when carefully dried with a stove heat, retains its aroma and bitterness for a long time.

THERAPEUTICAL EFFECTS.—Wormwood is an excellent indigenous anthelmintic, possessing also tonic and stimulant properties, so that its use continued after the expulsion of the worms, prevents their reproduction. It is well adapted for giving tone to the digestive organs in debilitated habits.

DOSE AND MODE OF ADMINISTRATION.—In powder, ʒss. to ʒj. M. Cazin recommends it to be given in the form of wine, prepared by digesting an ounce of the herb with an equal quantity of garlic in a bottle of white wine; the dose of this is from f℥j. to f℥ij. every morning.

Infusum Absinthii, (Wormwood, dried, ℥iss.; boiling water, Oj.; infuse for an hour and strain.) Dose f℥j. to f℥ij.

Tinctura Absinthii, (Dry wormwood cut fine, one part; proof spirit, twelve parts; macerate for six days, express and filter.) Dose, fʒij. to f℥ss.

INCOMPATIBLES.—The sesqui-salts of iron; acetate of lead; and sulphate of zinc.

ALLIUM SATIVUM, E. *Garlic.* A native of Italy, Sicily, and the South of France, commonly cultivated in our gardens; belonging to the class *Hexandria,* order *Monogynia,* in the Linnæan arrangement, and to the natural family *Liliaceæ.*

BOTANICAL CHARACTERS.—Stem, a foot and a-half to three feet high, surrounded with many linear, grass-like leaves, and bearing a head of many whitish flowers emerging from a membranous spatha.

PREPARATION.—The bulb is dug up for use in the month of August, cleaned and dried in the sun, and kept in bunches in a dry place.

PHYSICAL PROPERTIES.—The bulb, as it is termed, consists of several small bulbs, called cloves, grouped together within a common membranaceous covering, which, when dry, is of a dirty whitish colour, and a withered aspect; the cloves have each their proper covering, they are white and succulent, of a strong, disagreeable, peculiar odour, and an acrid, pungent taste.

CHEMICAL PROPERTIES.—Garlic consists of an acrid, volatile oil, fecula, albumen, and a saccharine matter; its medical properties depend on the volatile oil, which is heavier than water, of a yellowish colour, and a very penetrating odour; it is a peculiar sulphurised compound composed of 6 atoms of carbon, 5 of hydrogen, and 1 of sulphur (Wertheim).

THERAPEUTICAL EFFECTS.—Garlic, though now seldom employed as an anthelmintic in regular practice, and consequently omitted from the last edition of the London Pharmacopœia, is an excellent remedy in ascarides. Roque states that he has employed it with great success; he gives the infusion by the mouth and by injection, and at the same time causes friction to be made with a liniment of it over the abdomen.

DOSE AND MODE OF ADMINISTRATION.—In substance, ℥ss. to ℥j. swallowed whole, or made into pills with soap; of the expressed juice, min. xx. to min. xxx. on sugar; of an infusion prepared by infusing ℥ss. of the bulb in f℥vj. of water or milk, f℥ij. to f℥iij. two or three times daily.

Syrup of Garlic, (Garlic, one part; boiling water, eight parts; sugar, sixteen parts). Dose, f℥ss. to f℥j.

FILIX, E. *Rhizome of Nephodrium* (*Lastrea*, Presl.) *filix-mas. Male Shield Fern.* Indigenous; belonging to the Linnæan class and order *Cryptogamia Filices*, and to the Natural family *Filices* (*Polypodiaceæ*, Lindley.)

BOTANICAL CHARACTERS.—Rhizome or underground stem, large, tufted, scaly; producing in spring beautiful fronds or leaves, pinnate, with oblong, serrated, obtuse, leaflets.

PREPARATION.—The rhizome should be dug up in summer, cleared of root-fibres, &c., but not washed, and dried quickly and thoroughly in the open air, in the shade, or in a hot-air press at a temperature not above 140° F.; the tufts and those parts of the root-stock which are greenish internally, are alone to be kept; they should be reduced to powder immediately, and preserved in well-stoppered bottles; the druggist's stock should be renewed annually, as in two years the plant loses its medical properties.

PHYSICAL PROPERTIES.—The powdered root is of a greenish yellow colour, has a rather disagreeable odour, and a nauseous, bitter, somewhat astringent taste.

CHEMICAL PROPERTIES.—It contains a small portion of an odorous, volatile oil, on which its anthelmintic properties seem to depend; fixed oil, fecula, uncrystallizable sugar, gum, and woody fibre, &c. The results of a very elaborate analysis by Bock show that 1000 parts of the dry root contain 0·4 of the volatile oil and 60 of the fixed oil.

THERAPEUTICAL EFFECTS.—The powder of the male-fern root is perhaps one of the most efficacious anthelmintics we possess in the treatment of tænia, and as an indigenous remedy it is especially worthy of attention. Bremser, however, in his treatise on intestinal worms, states that, "though an excellent remedy against *Bothriocephalus latus* (the tape worm of the Swiss), it is not so efficacious against *Tænia solium* (the tape worm of this country.) That such a statement is not correct, has been recently proved by the investigations of Dr. Christison on its action; in upwards of twenty instances in which the ethereal extract was either employed directly by himself, or the particulars of which were communicated to him by others, in every case without exception the worm was discharged after a single dose and usually in one mass, and for the most part without pain or other uneasiness either before or during its action; but in a few, griping sickness and even vomiting occurred. My own experience, too, of the remedy in some cases in which I had an opportunity of trying it was altogether so satisfactory as to lead me to estimate it as highly as any other medicine of this class in cases of tape worm. It is, however, of the utmost importance that the preparation used be pure and well prepared from the true fern. It would also seem, from cases which have been recently recorded, that the worm is not so apt to be reproduced as after the use of other remedies.

DOSE AND MODE OF ADMINISTRATION.—Powder, ʒj. to ʒiij.; it should be given in the morning early, and followed in two hours afterwards by a brisk purge; but the powder, no matter how well kept, is uncertain in its action, and the following is the preparation now always used:—

Extractum Filicis, (Triturate the newly dried root not very finely, pack rather loosely in a percolator, and exhaust by sulphuric ether in the way of displacement; distil off the greater part of the ether, and expose the residue to a vapour bath temperature for a few minutes in an open basin of glass or porcelain) This extract, which is an oleo-resin, is when properly prepared a thick dark-green fluid of the consistence of strong syrup, and has a rather agreeable violaceous odour. Christison recommends it to be given in emulsion, by triturating from 18 to 24 grains with yoke of egg and adding gradually syrup of orange and water. If the worm do not come away in six hours, a brisk purgative should be given. In the Hamburgh Pharmacopœia for 1852, the extract of male fern is said to be best prepared from the fresh roots by means of a pneumatic press.

GIGARTINA HELMINTHOCORTON, *(Lameroux.)* *Corsican Moss.* A native of the shores of the Mediterranean about Corsica. The substance known in the shops as Corsican moss consists of fragments of a great variety of algæ ; Decandolle enumerates no less than about five and twenty. A small, though the most essential part of the mixture, is the plant above named.

PHYSICAL PROPERTIES.—Corsican moss, as met with in commerce, consists of brownish filaments mixed with broken, irregular fronds, having whitish or greenish articulations ; it has a strongly saline odour and a nauseous bitter taste.

CHEMICAL PROPERTIES.—It consists of vegetable jelly, on which we may suppose its anthelmintic properties to depend, but the nature of which is not well known, vegetable fibre, salts of lime and soda, and a trace of iron, manganese, and silica. Its active principle is soluble in water.

THERAPEUTICAL EFFECTS.—Corsican moss has been used by the natives of Corsica for several centuries, as a remedy for intestinal worms ; it appears to be useful in cases of lumbrici, particularly when occurring in young children. Bremser speaks highly of its anthelmintic properties, which he ascribes to the chloride of sodium it contains.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒij. made into an electuary with honey or treacle.

Infusion of Corsican moss, (Corsican moss, ℥iss.; boiling water, f℥iv.; infuse for two hours and strain.) Dose, fʒij. to f℥ss. in a cupful of water or milk.

Jelly of Corsican moss, (Corsican moss, ℥j.; sugar, ℥ij.; white wine f℥ij.; isinglass, ʒss.; boil and strain). Dose, ʒj. to ʒij.

KOUSSO. *The dried flowers of Brayera anthelmintica.* This tree, belonging to the Natural family *Rosaceæ,* is a native of Abyssinia, in which country its flowers are a popular anthelmintic amongst the natives. They have been used more or less in France since 1824, but were not introduced into the British islands until about ten years ago. It is not officinal in any of the British pharmacopœias.

BOTANICAL PROPERTIES.—A tree from twenty to thirty feet high, with round branches, alternate imparipinnate leaves, sheathing at the base, and small, greenish, diæcious flowers in crowded panicles, resembling somewhat those of the elm.

PREPARATION.—The flowering panicles are gathered before the seeds are quite ripe, whilst still a number of florets remain unchanged, and are dried in the sun ; for medical purposes they are reduced to powder.

PHYSICAL PROPERTIES.—The bunches of flowers are of a greenish-yellow colour, but on close examination the edges of the petals are purplish ; they have a fragrant balsamic odour, when freshly opened, compared by Pereira to the combined odour of tea, hops, and senna leaves ; the taste is slightly acrid and unpleasant.

CHEMICAL PROPERTIES.—According to the analysis of Wittstein, Kousso contains two varieties of tannin, a bitter acrid resin and a tasteless resin, a fatty oil, chlorophylle, water, sugar, gum, &c. Martin states that he has obtained from it a crystalline principle, soluble in alcohol and ether, and which he proposes to name *Kwoseïne*. The infusion and decoction are changed to a dark green colour by the sesqui-salts of iron.

ADULTERATIONS.—Owing to its scarcity and high price, Kousso is much adulterated, or rather a compound of, it has been conjectured, powdered pomegranate bark and jalap is sold for it. The only security against the fraud is to purchase the flowers in the dried state, when it may be readily seen if they possess the characters above described.

THERAPEUTICAL EFFECTS.—This substance has for at least two centuries borne the highest repute amongst the Abyssinians, who are much afflicted with the tape-worm, for its expulsion from the human intestines; and the experience of all who have tried it, both on the Continent for years back, and in England since its introduction, is confirmatory of its efficacy. It does not seem to produce any very manifest physiological effects, causing usually but slight nausea and a sensation of thirst; in some cases, however, it excites vomiting. Its action on the bowels is but slight, and the worms are often expelled alone, but it is more advisable to give a mild purgative a short time before it has been taken. It manifestly acts as a poison to the parasites, for in most of the cases in which it has been tried, the worms have been expelled dead; and Küchenmeister, in his experiments on anthelmintics, found that tape-worms placed in an infusion of Kousso mixed with milk died within half an hour of their introduction.* Its operation is admitted by all to be not alone effectual but safe, producing less disturbance of the system than most other remedies of this class; it is also equally effective, whether it be the *Tænia solium* or *Bothriocephalus latus* which is present in the intestines. But it must be remarked that although Kousso expels the tape-worm, it does not remove the diseased condition of the system on which the production of the parasite depends.

DOSE AND MODE OF ADMINISTRATION.—From ʒvj. to ℥j. for an adult: for children from ʒss. to ʒij. The following is the mode in which it is administered:—The powdered flowers are to be mixed with luke-warm water—for an adult about ten ounces, and allowed to infuse for a quarter of an hour, a little lemon-juice is then to be added, and the infusion being stirred up, the whole is taken, liquid and powder, at two or three draughts at short intervals, being washed down by cold water and lemon-juice. To promote the operation, tea—without sugar or milk, may be taken. In three or four hours, if the remedy has not operated, a dose of castor-oil or a saline purgative should be administered. The dose is best administered in the morning, fasting; the last meal of the previous evening should be a light one; and the action of the remedy seems to be promoted by a mild purgative having been taken on the day before.

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* See on Medical and Vegetable Parasites, &c. Sydenham Society's Edition, 1857, vol. i. page 148.

MUCUNA, D. L. E. *Cowitch, or Cowhage. The hairs (hairy down, D.) from the pods of Mucuna pruriens,* D. L. E. This plant, Decandolle's nomenclature for which has been adopted in the British pharmacopœias, is a native of the West Indian islands, belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley,) and to the Linnæan class and order *Diadelphia Decandria.*

BOTANICAL CHARACTERS.—A twining shrub, bearing purplish flowers, with a disagreeable, alliaceous odour, in axillary racemes; succeeded by coriaceous legumes, each containing three to five seeds.

PHYSICAL PROPERTIES.—The entire legumes, with the hairs attached, are usually imported; they are shaped like the letter *ſ*, of a brownish colour, from two to four or five inches long, thickly clothed with strong brown bristles or setæ, which, under the microscope, appear finely acuminate and serrated towards the point; these bristles separate easily and adhere obstinately to the skin, producing intolerable itching, accompanied by intense heat, and sometimes pain and swelling.

THERAPEUTICAL EFFECTS.—The operation of cowitch as an anthelmintic seems to be completely mechanical; the minute hairs wounding or irritating the worms, thus obliging them to let go their hold on the coats of the intestine, which is protected from injury by its mucous secretion. It is chiefly serviceable in cases of ascarides and lumbrici, having but little effect on the tape-worm; indeed by many practitioners it is esteemed, and probably not without reason, as the best vermifuge for the lumbrici.

DOSE AND MODE OF ADMINISTRATION.—The legumes are dipped in syrup, and then scraped, so as to remove the hairs; this process is repeated with fresh legumes until the syrup acquires the consistency of honey; of this a tea-spoonful is given to a child, or a table-spoonful to an adult, for three successive mornings before breakfast, the last dose being followed by a brisk purge.

PETROLEUM, L. E. *Petroleum; Rock oil; Barbadoes tar. A blackish liquid bitumen, exuding spontaneously from the earth,* L. A mineral production, found floating on the waters of springs and lakes in several of the West India Islands.

This substance has been very properly omitted from the last edition of the Dublin Pharmacopœia, for although still retained by the London and Edinburgh colleges, it is altogether discarded from practice. It was formerly employed in cases of tape-worm, both inwardly in the form of emulsion, and externally by friction over the abdomen.

PUNICA GRANATUM, RADICIS CORTEX, D. GRANATI RADIX, L. E. *Pomegranate root-bark; Bark of the root of Punica granatum.*—A native of the North of Africa, introduced into the South of Europe, where it now grows freely; belonging to the Linnæan class and order *Icosandria Monogynia*, and to the Natural family *Myrtaceæ*.

BOTANICAL CHARACTERS.—A small handsome tree, growing to the height of twenty feet, with a brownish bark, and smooth leaves on short footstalks; it produces in July, at the extremities of the young branches, splendid rich-scarlet flowers, which are succeeded by the orange-like fruit, crowned with the hardened persistent calyx.

PHYSICAL PROPERTIES.—Pomegranate bark is usually met with in short quills, portions of quills, or strips with pieces of the root attached, of a greyish-yellow colour externally, yellowish internally, brittle not fibrous, with a faint odour, and an astringent not bitter taste.

CHEMICAL PROPERTIES.—According to Mitouart's analysis, it consists of tannin, wax, a sweetish substance (part of which is soluble in alcohol, and part in water, the former crystallizable, the latter having the characters of Mannite,) and free gallic acid in large quantity. Righini has recently discovered in it a peculiar acrid oleo-resinous principle, which he has named *Punicine*, and on which it is probable that its vermifuge properties depend.

ADULTERATIONS.—The root bark of the common barberry (*berberis vulgaris*), and of the box tree (*Buxus sempervivens*), are said to be sometimes substituted for that of the pomegranate; the fraud is easily detected, as neither of these substances, although very bitter, possesses the least astringency.

THERAPEUTICAL EFFECTS.—The bark of the root of the pomegranate is an excellent vermifuge in cases of tape-worm, and is much employed in various parts of Europe; but it is chiefly used in India, where it is said scarcely ever to fail, if properly administered; some practitioners state that it should not be employed unless joints of the worm have already come away naturally. In Küchenmeister's experiments, before cited at page 27, a decoction of pomegranate root-bark with milk, was found to kill tape-worms in from three to three and a-half hours; he further states that he prefers the extract prepared according to the form given below to all other remedies for the tape-worm with which he is acquainted.*

DOSE AND MODE OF ADMINISTRATION.—Two ounces of the bruised bark, stripped from the fresh root if possible, are macerated for twenty-four hours in two pints of water, then boiled to one-half, and filtered; this is given in three doses, with an interval of half an hour between each dose; vomiting frequently occurs after the first or second dose, but this should not prevent us from administering a third. Soon afterwards the patient passes many stools in which joints of the worm are expelled. The dose should be occasionally repeated for four or five days after fragments of the worm have ceased to come away. Most practitioners have found the dried root to be inert.

Decoctum Granati radicis, L. (Pomegranate root, sliced, ℥ij.;

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* *Opus citatum*, p. 174.

distilled water, Oiss.; boil down to a pint and filter). Dose f℥iv. to f℥viij.

Extractum Punicis granati, KUCHENMEISTER, (Pomegranate root bark, slightly bruised, ℥iv.; macerate for twenty-four hours in f℥xvj. of distilled water; then boil with a gentle heat for twelve hours, until ℥vj. remain.) To be taken in 3-4 doses at intervals of from half an hour to one hour.

SABADILLA, E. *Cevadilla. Fruit of Veratrum sabadilla, of Helonias officinalis, and probably of other Melanthaceæ.* This plant, which has been named *Asagræa officinalis* by Lindley, and *Schœnocaulon officinale*, by Gray, is a native of Mexico, belonging to the Linnæan class and order *Polygamia Monœcia*, and to the Natural family *Melanthaceæ.*

BOTANICAL CHARACTERS.—A bulb, sending up numerous grassy leaves, from the centre of which springs an annual stem, about six feet in height, terminated by a spike of small white flowers, succeeded by numerous trifollicled capsules.

PHYSICAL PROPERTIES.—The fruit consists of three follicles, oblong, adherent at the base, about half an inch in length; they are composed of a thin, yellowish, elastic membrane, containing from one to three shining black seeds; the seeds have little odour, but when powdered and snuffed into the nostrils, they produce violent sneezing and a discharge of mucus; they have an acrid, intensely bitter taste, which is very permanent.

CHEMICAL PROPERTIES.—Cevadilla consists of fatty matter, *cevadic acid*, wax, *veratria* combined with gallic acid, (and, according to Couerbe, a second crystalline body named by him *sabadilline*,) yellow colouring matter, and gum.

THERAPEUTICAL EFFECTS.—Although possessed of highly poisonous properties, cevadilla has been employed internally as an anthelmintic with much success in cases of tape-worm and of ascarides; its use has hitherto been almost entirely confined to the Continent, and from the numerous instances of its successful employment recorded by different practitioners, it appears deserving of a high character as a vermifuge. (See, also, *General Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—Cevadilla should be administered with caution, and its use always commenced with very small doses, in order to ascertain how far it will be borne by the digestive organs. M. Cazin, of Boulogne, who has had much experience in vermifuge remedies, prescribes it as follows:—"For children, from a grain and a-half to four or five grains of the powdered seeds, mixed with syrup of rhubarb; and for adults, eight or more grains, with the addition of a little sugar and a few drops of oil of fennel;" in every case he repeats the dose daily for four days, after which he administers for some time the infusion of chamomile.

Enema of Cevadilla. (Cevadilla, ʒij.; water, f℥x.; milk, f℥iij.;

the cevadilla is boiled in the water, until it is reduced to seven ounces, then filtered, and the milk added.) To be administered in cases of ascarides.

SANTONINE.—This is the active principle of *Worm-seed*, the *semen-contra* of the older pharmaceutists. *Worm-seed* has been omitted from the last edition of the Dublin pharmacopœia; as sold in the shops, it appears to be a mixture of flower-buds with their foot-stalks, and according to Guibourt, that which is imported from the Levant is obtained from the *Artemesia contra* of Linnæus, which belongs to the Natural family *Compositæ.*

Santonine occurs in beautiful white crystalline plates, of great brilliancy; but on exposure to light they rapidly change to yellow. It has a bitter taste, is very insoluble in water, requiring 5,000 parts for its solution, but dissolves readily in fatty matters and in alcohol; it volatilises at a low heat. The process for its preparation in the pure state is both prolonged and difficult; and moreover as it is kept with difficulty, it bears a very high price; nevertheless it can be obtained in a perfect condition by care, and is much more certain in its effects than the following preparation proposed by M. Gaffard, which he calls brown or impure santonine, and which he has found to act very efficaciously when ascarides or lumbrici are present in the intestines:—*Brown Santonine.*—"Take of Aleppo worm-seed three ounces; carbonate of potash one ounce; slaked lime, sifted, half an ounce; water, from three pints to three pints and a-half. Place the mixture on the fire, stirring occasionally with a wooden spatula; let it boil for an hour; on removing it from the fire, pass it with expression through a linen cloth, let it settle, decant, and add hydrochloric or nitric acid until it reddens litmus without being sensibly acid to the tongue, allow it to rest, pass it through a filter previously moistened, or through a piece of close canvas, and allow the product which remains on the filter to dry in the open air until it acquires the consistence of firm butter." My own experience of pure santonine is most favourable, and I have rarely found the most obstinate cases of ascarides or lumbrici resist its prolonged use: the brown santonine I have not employed.

DOSE AND MODE OF ADMINISTRATION.—Brown santonine is best given according to M. Gaffard in the form of lozenges, which may be prepared as follows:—Brown santonine, ʒiij.; powdered sugar, ℥xiij.; powdered gum, ℥iss.; essential oil of lemon, min. xxv. Place the brown santonine in a marble mortar; add by degrees, and with constant trituration, the sugar mixed with the essential oil and the gum, so as to make a homogeneous powder. Form with a sufficient quantity of water a mass of the desired consistence, and divide it into lozenges, each of which shall weigh, when dried, fifteen grains: each lozenge will then contain somewhat more than one-third of a grain of brown santonine. For infants under six months the dose will be one lozenge night and morning; from six months to a year, two lozenges night and morning; from one to two years, three, and from two to four years, four, night and morning; for children of five years and upwards, a lozenge for each year of the child's age should be given, night and morning. The medicine to be continued until the worms are no longer passed. Pure santonine may be given in powder combined with scammony, rhubarb, or in anemic children with the powder of iron. The dose is from gr. ss. to gr. ij. according to the age of the child. In many cases under its use the urine acquires a bluish tint. Küchenmeister found that a solution of santonine in castor oil mixed with albumen killed ascarides in ten minutes, while without the oil it had no effect, nor either had a watery infusion. He therefore recommends it to be given in oil in the proportion of from two to five grains to an ounce of castor oil. In the case of ascarides in the rectum, the oily solution might be administered in the form of enema. The French prescribe pure santonine in the form of lozenges made with white sugar and mucilage.

SPIGELIA, E. *Root of Spigelia Marilandica; Carolina-pink; Worm-grass.* A native of the United States; belonging to the Linnæan class and order *Pentandria Monogynia,* and to the Natural family *Gentianaceæ (Loganiaceæ,* Lindley).

BOTANICAL CHARACTERS.—A perennial root; sending up numerous single stems; bearing, in the month of July, rich carmine coloured flowers, in racemes.

PHYSICAL PROPERTIES.—Usually met with in bundles of the entire plant, about twenty inches long. The officinal part consists of numerous, yellowish-brown fibres, proceeding from a small, dark-brown rhizome. They have a faint odour, and a bland, somewhat nauseous taste.

CHEMICAL PROPERTIES.—The root consists of acrid resin, tannin, bitter extractive, and woody fibre, with a trace of fixed oil.

THERAPEUTICAL EFFECTS.—Spigelia root, in consequence of its being much more active in the recent state than when dried, bears a higher character as an anthelmintic in America than in Europe, and being, therefore, not much used in this country, has been omitted from the last editions of the Dublin and London Pharmacopœias. It is the most popular vermifuge in the United States for the expulsion of lumbrici, possessing, however, little or no power over any other species of intestinal worm.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to gr. xx. for children.

Infusum Spigeliæ, U. S. Pharmacopœia. (Spigelia root, ℥ss.; boiling water, f℥xvj.; macerate for two hours in a covered vessel, and strain.) Dose, f℥ss. to f℥j. for a child; four times the quantity for an adult. However administered, it should be always followed by a strong mercurial purge.

STANNI PULVIS, D. E. *Powder of Tin.* Tin is found in nature chiefly in the form of Peroxide, existing in large quantities in Cornwall, in South America, and in the East Indies.

PREPARATION.—"Grain tin, a convenient quantity: melt the tin in a black lead crucible, and while it is cooling, stir it with a rod of iron until it is reduced to powder. Let the finer particles be separated by means of a sieve, and when, after having been several times in succession shaken with distilled water, the decanted liquor appears quite clear, let the product be dried and preserved for use;" *Dublin.* "Melt tin in an iron vessel; pour it into a mortar previously heated rather above the fusing point of the metal; triturate briskly as it cools, ceasing as soon as a considerable proportion is finely pulverized; sift the product, and repeat the process with what is left in the sieve;" *Edinburgh.*

PHYSICAL PROPERTIES.—Metallic tin is of a bluish-white colour, brilliant, soft, and malleable, with but little tenacity; it emits a slight peculiar odour when rubbed. Specific gravity 7·3.

CHEMICAL PROPERTIES.—It melts at 442° F.; if the heat be increased, it oxidises rapidly, and at a red heat burns brightly; it dissolves slowly in dilute hydrochloric acid, but rapidly if the acid be strong and boiling; nitric acid slightly diluted acts on tin with great violence, heat is produced, orange fumes disengaged, and pure peroxide of tin is formed.

ADULTERATIONS.—Pewter filings are sometimes substituted for tin filings in commerce; and Christison says that lead powder is not unfrequently sold for powder of tin. These adulterations may be detected by first acting on the specimen with nitric acid, so as to convert it into the peroxide, then boiling the powder thus obtained with distilled water, when, should the tin be pure, the water will not precipitate with solution of sulphate of magnesia.

THERAPEUTICAL EFFECTS.—Powder of tin is a most effectual anthelmintic, especially for children, in cases of lumbrici; not so useful in cases of ascarides, and producing little or no effect in cases of tænia. It appears to act mechanically, and consequently its administration should be always followed by an active cathartic.

DOSE AND MODE OF ADMINISTRATION.—ʒss. to ʒj. made into an electuary, with an equal quantity of honey or treacle.

TEREBINTHINÆ OLEUM, D. L. E. *Obtained from common turpentine, which is yielded by Pinus Sylvestris, D. The rectified oil distilled from turpentine (Terebinthina Americana) an oleo-resin which flows from the trunk of Pinus palustris and Pinus tæda,* L. *The volatile oil of the liquid resinous exudation of various species of Pinus and Abies,* E. *Oil of turpentine; Spirits of turpentine.* The trees from which the varieties of common turpentine met with in commerce are procured, are inhabitants of the forests of the colder regions of Europe and North America, and most of them are cultivated in the British Isles; they are placed in the Natural family *Coniferæ (Pinaceæ,* Lindley), and in the Linnæan class and order *Monœcia Monadelphia.*

PREPARATION.—*Common Turpentine*, *Terebinthina vulgaris*, is procured in America by cutting off the outer bark near the root of the tree, and making an incision through the inner bark into the wood; as the turpentine exudes, it flows into a hole dug in the earth, whence it is removed into casks. *Volatile oil of turpentine* is an article of the Materia Medica in the three British Pharmacopœias, being always prepared by the manufacturer on a large scale. This oil is directed to be further purified by the Edinburgh College. *Oleum Terebinthinæ purificatum*, E. (Oil of turpentine, Oj.; water, Oiv.; distil as long as oil comes over with the water.)

PHYSICAL PROPERTIES.—Oil of turpentine is a transparent, nearly colourless, limpid fluid; of a peculiar, penetrating, balsamic odour; and a pungent, bitter, disagreeable taste. Specific gravity, ·872 at 50° F.

CHEMICAL PROPERTIES.—Its composition is $C^{20} H^{16}$. It is very soluble in ether, less so in alcohol, and very sparingly soluble in water. Exposed to the air it gradually absorbs oxygen, thickens and becomes yellowish. It boils at 314°, and cooled down to — 17° it deposits white crystals, *stearopten*, which are heavier than water. Oil of turpentine is very inflammable, burning with a heavy, yellowish flame, and much smoke; in chlorine gas it takes fire spontaneously.

THERAPEUTICAL EFFECTS.—As perhaps the most effectual remedy we possess for the expulsion of tape-worm, oil of turpentine stands deservedly in high repute. It operates as a specific poison to the parasite, causing its immediate death; thus in Küchenmeister's experiments the tape-worm died in from an hour to an hour and a quarter in a mixture of oil of turpentine and white of egg. It is nearly equally efficacious over the lumbrici; and has been also used with much benefit in the form of enema for ascarides in the rectum. (See *Cathartics*, *Diuretics*, *Epispastics*, and *General Stimulants.)*

DOSE AND MODE OF ADMINISTRATION.—As an *anthelmintic:* for adults, f℥ss. to f℥ij.; for children, fʒj. to f℥ss. It may be given either floating on the surface of water, or made into an emulsion with mucilage (of which it requires equal portions), or with yolk of egg (one to every ounce).

·*Confectio Terebinthinæ*, D. (Oil of turpentine, f℥j.; liquorice root, in powder, ℥j.; clarified honey, by weight, ℥ij.; rub the oil of turpentine with the liquorice powder, then add the honey, and beat them all together into a uniform consistence.) This form has been adopted from Dr. Copland's Dictionary of Practical Medicine. Confection of turpentine is readily miscible with water, for which method of administration it is well adapted, but in the solid state it is very nauseous. The dose, as an *anthelmintic*, is from ℥ij. to ℥iv. for adults, and from ℥ss. to ℥j. for children.

Enema Terebinthinæ, D. L. E. ("Oil of turpentine, f℥j.; mucilage of barley, f℥xvj.; mix," D. "Oil of turpentine, f℥j.; the yolk of one egg; decoction of barley, f℥xix.; rub the oil with the yolk of egg, and mix in the decoction," L. "Oil of turpentine, f℥j.; yolk of egg, a sufficiency; water, f℥xix.; rub the oil and yolk carefully together, and then add the water gradually," E.) The yolk of egg has been omitted by the Dublin College, for oil of turpentine forms a perfect emulsion with the *mucilage* of barley; but as in the London Pharmacopœia the decoction of barley, and in that of Edinburgh water, are directed to be employed the addition of the yolk of egg is necessary to suspend the turpentine which might otherwise give rise to much irritation of the rectum.

CHAPTER III.

ANTISPASMODICS.

ANTISPASMODICS, as their name indicates, are medicines which counteract irregular or inordinate muscular action,—*spasm*. This deranged state of the system depends on so many different causes, and is produced by so many different sources of irritation, that its successful treatment will very frequently depend on the employment of remedies calculated to remove the more immediate cause or source of irritation, by which the spasmodic affection is produced. It follows, therefore, that under peculiar circumstances the remedies which will be found most successful in counteracting spasm, must be derived from very different divisions of the Materia Medica; and thus the term Antispasmodic will become applicable to a *narcotic*, a *sedative*, a *nauseant*, an *anæsthetic*, a *stimulant*, a *cathartic*, or a *tonic;* and in some cases remedies which directly depress the vital powers, such as the prolonged use of the warm-bath, and even in a few cases the abstraction of blood, are the most effectual means of subduing spasm. There are, however, certain medicines which appear to exert a direct control over spasmodic action, independently of any influence upon its exciting causes, and these form the subject of inquiry in the present chapter. The precise mode in which such agents produce their effects is not well understood, and the present extent of our knowledge regarding them is only that they act on the nervous system, from deranged conditions of which the state demanding their employment arises. Many of the substances contained in this class of medicines have a powerful, usually disagreeable odour, such as assafœtida, galbanum, valerian, &c. ; and we consequently find that the older therapeutists included amongst antispasmodics all remedial agents possessing these properties ; in the present day, however, the number of *pure* antispasmodics is much diminished, and it is probable that as our knowledge of therapeutics advances, this *sub*-division of medicines will be abolished. The prescriber must remember that antispasmodics vary in their effects on different individuals probably more than any other remedies, also, that by repetition their power diminishes rapidly, and that their effects are manifested quickly, but are very evanescent.

ASSAFŒTIDA, D. L. E. *Gum-resinous exudation (from the cut root, L.) of Narthex assafœtida,* D. L ; *of Ferula assafœtida, probably also of Ferula Persica,* E. A native of the south of Persia and the neighbouring districts of India, especially of Khorassan and Affghanistan ; belonging to the Linnæan class and order *Pentandria Digynia,* and to the Natural family *Umbelliferæ* (*Apiaceæ,* Lindley.)

BOTANICAL CHARACTERS.—A tall perennial plant, 5 to 8 feet high. The root is a foot or more in length, fusiform, 3 inches in diameter at the top, with a dark greyish corrugated surface, white or ash-coloured in the centre, abounding in an opaque, milky, fœtid juice ; leaves numerous, spreading, about 18 inches in length in the adult plant, of a dry leathery texture ; stem erect, terete, striated, solid throughout, about two inches in diameter at the base, terminating in a luxurious head of compound umbels ; flowers small, both barren and fertile ; fruit from 7 to 15, ripening on the partial umbels, supported on short stalks ; seed flattened, with plain albumen.

PREPARATION.—The process for obtaining assafœtida in the present day is stated by M. Buhse, a recent traveller in Persia, to be precisely similar to that described by Kæmpfer 160 years ago as follows :—When the plant is four years old, the root-leaves are removed, and in forty days afterwards the top of the root is sliced off ; a fœtid juice exudes, which concretes in a couple of days, is then scraped off, and a fresh slice of the root made—more juice exudes, is collected as above, and the same process repeated from ten to twelve times within six weeks—until the root is completely exhausted. The juice is exposed to the sun to become harder, and then packed in casks and cases, which are sent, by way of Bombay, to Europe. The following directions are given by the London College for preparing the commercial article for use in medicine :—*Assafœtida præparata* ; " Assafœtida in lump, ℔j. ; water, sufficient to cover it ; boil the assafœtida with the water until they are mixed, strain the mixture through a hair sieve, and evaporate in a water bath, constantly stirring, to such a consistency that it will harden as soon as it cools."

PHYSICAL PROPERTIES.—Assafœtida is met with in commerce in irregular lumps from half a pound to three pounds in weight; pinkish-yellow and reddish-brown externally ; when recently cut, of a pearl-white colour, with a waxy lustre, but on exposure to the air rapidly acquiring a rose tint. It has a powerfully disagreeable, peculiar, alliaceous odour, and a strong, bitter, acrid taste. Specific gravity, 1·31 to 1·35.

CHEMICAL PROPERTIES.—It is composed of 65 per cent. of resin, 3·60 of volatile oil, 19·44 of gum, 11·66 of bassorin, with traces of saline matter, sulphate and carbonate of lime, extractive, lignin, &c., (Pelletier). According to Hlasiwetz, one pound of assafœtida of the best quality yields on the average one ounce of volatile oil, equal to about 3 per cent. It is a thin clear fluid, of a light yellow colour, with a penetrating smell, soluble both in alcohol and water ; it contains sulphuret of allyle (Maclagan,) its composition being $C^{24} H^{22} S^{3}$. The resin and volatile oil are the medicinal principles. Exposed to the air assafœtida is apt to become very hard, owing to the presence of the sulphate of lime, the *setting* of which is supposed to be the cause. It softens with a moderate heat ; and is inflammable, burning with a fuliginous flame ; is partially soluble in alcohol, ether and vinegar ; and may be formed into an emulsion with water. It is reduced to powder with difficulty, unless triturated with carbonate of potash.

THERAPEUTICAL EFFECTS.—Assafœtida is a powerful stimulating antispasmodic, especially adapted for the spasmodic nervous diseases of females, as hysteria and some forms of chorea and epilepsy. No remedy we possess is so successful in the treatment of hysteria, administered either during the paroxysm or in the interval, especially when given in large doses, by which means alone its full benefit in this disease can be obtained; in a hysteric paroxysm, we are frequently unable to administer medicines by the mouth, and when, given in the form of enema, assafœtida is found to be very effectual. In the convulsions of infants, especially when dependent on flatulence and in the flatulent constipation of the aged, few remedies are more efficacious. It has been also employed with much benefit in the chronic spasmodic stage of hooping cough, in pure spasmodic asthma, and in that peculiar spasmodic difficulty of breathing, so frequently the attendant of chronic catarrh. Its abominable odour, however, prevents it from being as generally used as its therapeutic powers would merit. Assafœtida has been also employed successfully as a vermifuge.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. in pills or emulsion.

Tinctura Assafœtida, D. L. E. ("Assafœtida, in small fragments, ℥v.; rectified spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Assafœtida, in small fragments, ℥v.; rectified spirit, Oij.; digest for seven days and filter," L. E. "This tincture cannot be made by percolation without much delay," E.). Dose, fʒss. to fʒiij.

Spiritus Ammoniæ fœtidus, D. L. E. ("Assafœtida, ℥iss.; rectified spirit, Oiss.; stronger solution of ammonia, f℥iij.; break the assafœtida into small pieces, and macerate it in the spirit for twenty-four hours; then distil off the entire of the spirit, and mix the product with the solution of ammonia. The specific gravity of this preparation is ·849," D. "Hydrochlorate of ammonia, ℥x.; carbonate of potash, ℥xvj.; rectified spirit; and water, of each, Oiij.; assafœtida, ℥v.; mix and distil, with a slow fire, three pints; specific gravity ·861," L. "Spirit of ammonia, f℥xss.; assafœtida, ℥ss.; break the assafœtida into small fragments; digest it in the spirit for twelve hours; distil over f℥xss. by means of a vapour bath," E.) Dose, fʒj. This is merely a solution of the volatile oil of assafœtida in the spirit of ammonia.

Pilulæ Assafœtidæ compositæ, D. (Assafœtida, ℥ij.; galbanum; myrrh; treacle, by weight, of each ℥j.; heat all the ingredients in a capsule, by means of a steam or water bath, and stir the mass until it assumes a uniform consistence.)—*Pilula Galbani composita*, L. (Prepared galbanum, ʒij.; myrrh; and sagapenum prepared, of each, ʒiij.; assafœtida prepared, ʒj.; soft soap, ʒij.; treacle, a sufficiency; beat them together to form a mass.)—*Pilulæ Assafœtidæ*, E. (Assafœtida; galbanum; and myrrh, of each, three parts; conserve of red roses, four parts, or a sufficiency.) Dose, gr. x. to ℈j.

Enema fœtidum, D. L. E. ("Tincture of assafœtida, fʒij.; warm water, f℥ij.; mix," D. "Prepared assafœtida, ʒj.; decoction of barley, Oss.; rub the assafœtida with the decoction gradually added until they are thoroughly mixed," L. "Add two drachms of tincture of assafœtida to the *enema catharticum*," E.)

Emplastrum Assafœtidæ, E. (Litharge plaster; and assafœtida, of each, ℥ij.; galbanum; and bees' wax, of each, ℥j.; liquefy the gum resins together and strain them, then add the plaster and wax also in the melted state, and mix all thoroughly.) Applied externally in hysteria, flatulence, and hooping cough.

CASTOREUM, D. L. E. *A peculiar secretion, from the follicles of the prepuce of Castor fiber.* D. E. *The preputial follicles of Castor fiber filled with their natural secretion,* L. *Castor.* The beaver, an inhabitant of the Northern parts of Europe and North America, is placed by Cuvier in the class *Mammalia*, order *Rodentia.* Both the male and female beavers are furnished with castor sacs. In the living animal the secretion contained in them is fluid, but when removed from the animal it concretes rapidly.

PHYSICAL PROPERTIES.—As met with in commerce, North American castor (the chief kind now imported into Britain) consists of the two sacs united together by a kind of natural ligament; they are wrinkled; of a reddish-brown colour externally, paler internally; breaking with a somewhat resinous fracture, sometimes quite hollow in the centre. It has a strong, peculiar, disagreeable odour, and a somewhat aromatic, bitter taste.

CHEMICAL PROPERTIES.—It contains volatile oil *(Carbolic acid)*, resin, albumen, a peculiar principle discovered by Brandes and named by him *Castorine* and to which it is stated to owe its properties, fatty matter, mucus, carbonate of lime, and salts of soda and potash. Castor yields its active principles almost entirely to alcohol, and but very imperfectly to water.

THERAPEUTICAL EFFECTS.—Castor was formerly in high esteem as an antispasmodic, but in the present day has nearly fallen into disuse, its employment being restricted to some of the milder forms of hysteria, in which any benefit it produces is probably owing to its nauseous smell and taste.

DOSE AND MODE OF ADMINISTRATION.—In substance from ʒj. to ʒij.

Tinctura Castorei, L. E. (Castor, ℥iiss.; rectified spirit, Oij.; macerate for seven days, express, and filter: "may also be prepared by percolation, like tincture of cassia," E.). Dose, fʒij. to fʒiv.

Tinctura Castorei composita, E. (Castor, bruised, ℥iiss.; assafœtida in small fragments, ʒx.; spirit of ammonia, Oij.; digest in a well-closed vessel for seven days, strain and express strongly the residuum, and filter. This tincture cannot be so conveniently prepared by the method of percolation.) Dose, fʒj. to fʒij.

COTYLEDON. *The herb of Cotyledon umbilicus; Common Navelwort.* An indigenous plant belonging to the natural family *Crassulaceæ* and the Linnæan class and order *Decandria Pentagynia.* This well known plant, the peculiar peltate orbicular leaves of which give it the name of navelwort from the mode of insertion of their footstalk, grows rather commonly throughout Ireland on rocks and the walls of old ruins ; it has a purplish stem about six inches high, and pale greenish-yellow flowers, pendulous in a simple raceme. Some years ago it acquired some note as a remedy for epilepsy, from the writings of Dr. Salter of Poole, and several other practitioners have corroborated his testimony of its good effects. My lamented friend the late Dr. Graves found it useful in some cases, while it altogether failed in others, (Dublin Quarterly Journal of Medical Science, vol. xiv. p. 257) ; but in every case in which I tried it, it failed to effect a cure, although in a few instances some good effect appeared at first to follow its administration. Dr. Salter, whose employment of this plant was altogether empirical, recommends for use the juice expressed from the entire herb while the leaves are green and succulent, or a fluid extract prepared from the juice by inspissation ; the dose of the former is one ounce ; of the latter one drachm, twice daily. I am not aware that the cotyledon has been tried in any other spasmodic disease than epilepsy.

FULIGO LIGNI, *Wood soot,* formerly contained in the British Pharmacopœias, is still much used on the continent, and for a number of years has been employed with excellent effect as an antispasmodic by many physicians in this city. It has been found most beneficial in the latter stages of hooping-cough in children, and in some forms of hysteria. It is prepared by burning wood under a small flue, and collecting the soot which is deposited in the chimney. It consists of a peculiar extractive matter called *pyretin,* some acetic acid, acetates of soda, potash, magnesia, and ammonia, creasote, &c. It yields its active properties partly to water, but more completely to alcohol. The preparations of soot that have been employed are as follow :—

Decoctum Fuliginis, (Wood soot, ℥iv. ; boiling water, Oiss., boil down to Oj. and strain.) Only used as an external application to chronic eruptions of the scalp, and to obstinate ulcers

Tinctura Fuliginis, (Wood soot, ℥ij. ; assafœtida, ℥j. ; proof spirit, f℥xxxij. ; digest for three days and strain.) Dose, fʒj. to fʒij.

Spiritus Fuliginis, (Wood soot, 1 part ; proof spirit, five parts ; water, fifteen parts ; distil four parts.) Dose, min. xx. to min. xxx.

Extractum Fuliginis, (Wood soot, one part ; boiling water, eight parts ; boil for fifteen minutes, strain through linen, and evaporate to a proper consistence.) Dose, gr. v. to gr. x.

GALBANUM, D. L. E. *Concrete gummy-resinous exudation of Opöidia galbanifera*, D., *probably of a species of Opöidia*, E. *Gum-resin of Galbanum officinale*, L. The true plant which yields Persian galbanum is involved in much doubt. M. Buhse in his travels in Persia mentions that he found it growing on the Damawend mountains. He believes it to be a species of *Ferula*, probably *Ferula erubescens*, but he states positively that it is not a species of either *Galbanum* or *Opöidia.* It belongs to the natural family *Umbelliferæ (Apiaceæ*, Lindley), and to the Linnæan class and order *Pentandria Digynia.* It is imported from India, and from the Levant.

PREPARATION.—It is probably procured from the root by a process similar to that followed for obtaining assafœtida; for use in medicine, the London College directs the commercial drug to be purified as follows:—*Galbanum Præparatum*, L. "Galbanum, in small lumps, ℔j.; water, sufficient to cover it; boil together until they are mixed, strain through a hair sieve, and evaporate in a water-bath, constantly stirring, so that it may harden when cold."

PHYSICAL PROPERTIES.—It occurs both in tears and in lump; the tears are globular, irregular, about the size of a pea, usually agglutinated into masses of a pale greenish-yellow colour, somewhat translucent, having a strong peculiar odour, and an acrid, disagreeable, bitter taste; the lump variety is of a darker colour, rather opaque, with a less powerful odour and taste; when exposed to cold both kinds become brittle, and may be readily reduced to powder.

CHEMICAL PROPERTIES.—Galbanum consists chiefly of resin and gum, with a small proportion of volatile oil, and malate of lime. It is almost entirely soluble in proof spirit, and partially so in rectified spirit and in ether; it forms an emulsion with water, and is rendered softer, but not melted by heat.

THERAPEUTICAL EFFECTS.—Galbanum is employed in the same cases as assafœtida, with which it is generally combined, being less energetic than that substance. It is more frequently used externally, as a stimulating antispasmodic, being better suited for plasters in consequence of its consistence.

DOSE AND MODE OF ADMINISTRATION.—In substance, either in pill or emulsion, gr. x. to gr. xx.

Emplastrum Galbani, L. (Prepared galbanum, ℥viij.; lead plaster, ℔iij.; turpentine, ℥j.; prepared frankincense, ℥iij.; to the galbanum and turpentine melted together, add first the frankincense and then the plaster melted over a slow fire, and mix.) Applied externally, spread on leather.

MOSCHUS, D. L E. *Inspissated secretion found in the follicle of the prepuce of Moschus moschiferus. Musk.* The musk animal, an inhabitant of the mountains of Eastern Asia, especially frequenting the steppes of the Altai, the banks of the river Irtysch, Mongolia, Thibet and Butan, as far as Tonquin, is placed by Cuvier in the class *Mammalia*, order *Ruminantia*. In the male animal, immediately in front of the præputial orifice, is situated a small sack filled with a viscid fluid, which in the dry state constitutes musk. It is imported into the British market principally from China.

PHYSICAL PROPERTIES.—The musk-bag, or as it is commonly called musk-pod, is somewhat oval, about 2½ inches long, and 1¾ inches broad, smooth and bare on one side, somewhat convex, and covered with stiff, brownish-yellow hairs on the other ; it contains from ʒiss. to ʒiij. of musk. Musk is in the form of small unctuous grains, of a deep reddish-brown colour, mixed with whitish hairs ; it has a strong, peculiar, diffusible, very persistent odour, and a bitter aromatic taste.

CHEMICAL PROPERTIES.—Musk consists of ammonia, stearine, elaine, cholesterine, acid oil combined with ammonia, volatile oil, an undetermined acid, gelatin, albumen, fibrine, carbonaceous matter, and numerous salts, *(Guibourt and Blondeau.)* It yields its active principles partly to water, but more completely to alcohol.

ADULTERATIONS.—Grain musk is usually adulterated ; dried bullocks' blood is employed for this purpose ; it may be detected by adding to an infusion of the suspected drug solution of corrosive sublimate ; if it be genuine it will not precipitate. Spurious musk-bags are not uncommon in commerce, they are most easily detected by the miscroscopic characters of the hairs with which they are covered, as I first pointed out in the *Dublin Quarterly Journal*, vol. i page 77. The hairs of the true musk-bag are furnished internally with distinct, regular, colour cells ; while none can be perceived in those found on the spurious pods.

THERAPEUTICAL EFFECTS.—Musk is not much prescribed now, in consequence of its high price ; it is nevertheless a stimulating antispasmodic of great power, and is administered with excellent effect in hysteria, in chorea, and in the subsultus tendinum and hiccough of fevers and other diseases assuming a typhoid type. In cases of hysteria of long standing, so nearly allied to epilepsy as to be scarcely distinguishable from it, I have obtained very beneficial results from the employment of musk.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. x. to gr. xx. It may be given in pill or made into an emulsion with gum arabic, and sugar and rose water.

INCOMPATIBLES.—Sulphate of iron ; nitrate of silver ; corrosive sublimate ; and infusion of bark.

RUTA, L. E. *Rue; Leaves (and unripe fruit,* E.*) of Ruta graveolens.* A native of the South of Europe, cultivated in our gardens. It belongs to the Natural family *Rutaceæ*, and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A small branching shrub ; with glaucous bluish-green leaves, and yellow flowers in umbellate racemes.

PHYSICAL PROPERTIES.—Although the leaves only are ordered by the London College, the entire plant is met with in the shops. It has a strong, disagreeable, somewhat aromatic odour in the fresh state, much of which is lost in drying ; and a bitter, acrid, unpleasant taste.

CHEMICAL PROPERTIES.—Its medicinal properties depend on volatile oil and bitter extractive; the former, *Oleum Rutæ*, is officinal in the London and Edinburgh pharmacopœias ; it is obtained by distilling the fresh herb with water. Oil of Rue is of a rich yellow colour, becoming darker by age ; it has the peculiar odour of the plant in a marked degree, and a bitter, acrid, warm taste ; its specific gravity is ·911. Rue yields its active properties to boiling water, but by decoction the volatile oil is dissipated.

THERAPEUTICAL EFFECTS.—Rue is a stimulating antispasmodic of some power, although not much employed in the present day. It has been administered with benefit in the spasmodic colic and general convulsions of children ; and in the hands of some practitioners is said to have proved useful in hysteria and idiopathic epilepsy.

DOSE AND MODE OF ADMINISTRATION.—Preparations of the fresh herb should be always employed, such as the infusion (prepared by infusing ℥j. of the herb in Oj. of boiling water, in a covered vessel, for an hour) ; or the oil: the dose of the former is f℥j. to f℥ij. ; of the latter min. ij. to min. v. in some agreeable syrup. The *Syrup of Rue* of the shops, employed as a domestic remedy in the colic of infants and children, is prepared by dissolving twelve drops of the oil in half an ounce of rectified spirit, and adding to it a pint of simple syrup.

Confectio Rutæ, L. (Rue, fresh, bruised ; carraway ; bay berries, of each, ℥iss. ; sagapenum, prepared, ℥ss. ; black pepper, ʒij. ; honey, ℥xvj. ; distilled water, a sufficiency ; rub the dry ingredients together to a very fine powder ; then to the sagapenum melted in the water and honey over a slow fire add the powder gradually, and mix all together.) Only used in enemas in the spasmodic affections of infants and children ; for this purpose, from ℈j. to ʒj. may be added to f℥vj. or f℥viij. of thin gruel.

SAGAPENUM, L. *Gum-resin of an unknown plant.* Imported from the Levant, and from Alexandria. The commercial article is directed to be prepared for use, *Sagapenum præparatum*, L., by a process similar to that for prepared galbanum.

PHYSICAL PROPERTIES.—It occurs in semi-translucent masses of a dark brownish-yellow colour, consisting of numerous tears agglutinated together ; has a fœtid odour, weaker than assafœtida, and a hot, acrid taste ; and breaks with a horny fracture.

CHEMICAL PROPERTIES.—According to the analysis of Pelletier, sagapenum consists of gum, resin, volatile oil, bassorine and some salts.

THERAPEUTICAL EFFECTS.—Sagapenum produces effects precisely similar to, but weaker than, assafœtida ; it is consequently scarcely ever employed now.

DOSE AND MODE OF ADMINISTRATION.—In substance, given in the form of pill, gr. v. to gr. xx.

SUCCINUM. D. *Amber.* The oil *(Oleum Succini)* is still retained in the Dublin Pharmacopœia, in which it is an article of the Materia Medica. Although once highly esteemed in medicine as an antispasmodic, this preparation possesses really such feeble medicinal properties, and is so little employed in the present day, that I may very well omit any account of it here. The dose of the oil is from min. v. to min. x. ; that of the acid, which was at one time employed, from gr. v. to gr. viij.

SUMBUL. *The root of an unascertained plant, probably some species of an Umbellifer.* Some years since, the attention of the profession was called to the medicinal properties of a substance which had been introduced into this country from India under the above name. Dr. Granville of London soon afterwards published a pamphlet on its efficacy in several nervous diseases ; and since then it has been more or less used in practice both in this country and America, although it would not appear to be possessed of any very decided therapeutical powers. It has been imported chiefly from Russia, and is stated to be procured from the district in the neighbourhood of Bucharest. It occurs in circular pieces, very light, from one to two inches in diameter and from two to three inches in depth, flat or slightly concave above where the root top had been cut off, and terminating abruptly below in several root branches. The transverse section exhibits a very porous fibrous structure, surrounded by an extremely thin smooth epidermis ; its colour internally is a dirty greyish-yellow with lighter coloured striæ, and externally very light brown. The odour is decidedly musk-like but evanescent, and its taste aromatic and slightly bitter. No correct analysis of Sumbul has been yet made, but it would appear to contain a volatile oil and resin.

The diseases in which this drug has been chiefly used are, as above stated, those of the nervous system, such as hysteria, epilepsy, delirium tremens, etc, but it has been also employed in cholera and is stated to bear a high character in Russia for its efficacy in that epidemic. Dr. Boyd, of the Somerset County Hospital for the Insane, states in his annual report for the year 1852, that he has found the tincture mitigate the severity of the fits in the epileptics in his institution.

Sumbul may be given either in infusion or tincture. The infusion, which I consider the preferable form, may be prepared by infusing

℥ss. of the bruised and torn root in half a pint of boiling water for an hour in a closely covered vessel, and straining ; the dose of it is from f℥ss. to f℥j. every second or third hour according to circumstances. The *tincture* is prepared by macerating for seven days ℥ij. of the coarsely powdered root in f℥xvj. of proof spirit, and straining ; dose, fʒj. to fʒij. The *resin* however has been the preparation most used in Russia, where it has been extensively employed both as a stimulating expectorant and antispasmodic. Dr. Murawieff gives the following formula for its preparation :—Slice the root into fine pieces, wash it with cold water until the water passes colourless ; then macerate for two hours, in a cool place, in a concentrated solution of carbonate of soda. Pour off the liquid and wash again with cold water. Infuse the dried root in rectified spirit, filter and add a little quick lime ; filter again, precipitate any dissolved lime with a little sulphur, treat the solution with animal charcoal and finally filter. Then distil off the spirit ; mix the residue with 3 parts of water, evaporate, wash with cold water and dry. The dose of the resin thus obtained is from a gr. ¼ to gr. j. twice or three times daily. It may be also administered in the form of tincture or syrup.

VALERIANA, D. L. E. *Root of Valeriana officinalis.* An indigenous plant, belonging to the Linnæan class and order *Triandria Monogynia,* and to the Natural family *Valerianaceæ.* The London College directs the root of the uncultivated plant to be employed.

BOTANICAL CHARACTERS.—The root is tuberous, perennial, sending up a smooth, erect, furrowed stem, from two to four feet high, which produces rose-coloured flowers in a somewhat panicled corymb.

PHYSICAL PROPERTIES.—The root, which should be dug up in autumn when the leaves have decayed, or in spring before the stem rises, consists of a short tuberous root-stock, and numerous root-fibres from two to six inches long, yellowish-brown externally, whitish internally, of a strong, penetrating, characteristic odour, and a bitter, acrid, somewhat aromatic taste. The roots of those plants which grow on the banks of rivers or in marshy places are generally inert.

CHEMICAL PROPERTIES.—It consists of woody fibre, resinous extractive, gummy extractive, resin, and a little more than one per cent. of volatile oil, which is crystallizable and has been termed *valerole,* and in which a peculiar acid, which has been named *valerianic acid,* is developed by exposure to the air. The volatile oil may be obtained from the dry root by distillation ; it is a mixture of a peculiar oil having a camphoraceous odour, and of valerianic acid, but which, according to Gerhardt, does not exist in the oil when first distilled, and even Guibourt, who denies this statement, asserts that valerianic acid does not exist in the fresh root, but is developed in the process of drying. It is to the valerianic acid that the active properties of the plant are due ; numerous processes have been lately proposed for obtaining this acid, but the most simple is by decomposing the valerianate of soda or of zinc by an acid, and distilling. Thus prepared it bears much resemblance to the volatile fatty acids; it is an oily liquid, colourless, with a strong, persistent odour of valerian, and an acid, pungent taste; it boils at 270°, and is very soluble in water, alcohol, and ether; its density is ·944, and its composition $C^{10}H^{10}O^{4}$. Valerian imparts its properties to both water and rectified spirit. Magnesia mixed with valerian completely removes its odour, which, however, may be again restored by the addition of sulphuric acid. The salts of valerianic acid are soluble, and have a sweetish taste and fatty aspect; some of them have been recently much employed in medicine, and having acquired a high character as therapeutic agents have been introduced into the last edition of the Dublin pharmacopœia, and processes given for their preparation. *Amylic alcohol* or *Fusel oil* (see *Supplementary agents,)* as it is termed by the Dublin College, is composed of $C^{10}H^{12}O^{2}$; by exposure to the air it absorbs oxygen and is converted into valerianic acid; but this change is more rapidly effected by heating it with caustic potash, or by the action of sulphuric acid and bichromate of potash in excess. The latter is the process adopted in the Dublin pharmacopœia, but as the other salts of valerianic acid are most easily prepared by the decomposition of valerianate of soda, the valerianic acid is immediately on its production converted into that salt by the addition of caustic soda. The following is the officinal formula:—*Valerianas Sodæ,* D. (Bichromate of potash, reduced to powder, nine ounces; fusel oil, four fluid ounces; oil of vitriol of commerce, six fluid ounces and a half; water, half a gallon; solution of caustic soda, one pint, or as much as is sufficient: dilute the oil of vitriol with ten ounces, and dissolve with the aid of heat the bichromate of potash, in the remainder of the water. When both solutions have cooled down to nearly the temperature of the atmosphere, place them in a matrass, and having added the fusel oil, mix well by repeated shaking, until the temperature of the mixture, which first rises to about 150°, has fallen to 80° or 90°. The matrass having been now connected with a condenser, heat is to be applied so as to distil over about half a gallon of liquid. Let this, when exactly saturated with the solution of caustic soda, be separated from a little oil that floats on its surface, and evaporated down until, the escape of aqueous vapour having entirely ceased, the residual salt is partially liquified. The heat should now be withdrawn, and when the valerianate of soda has concreted, it is, while still warm, to be divided into fragments, and preserved in a well stopped bottle.) The pungent colourless oily liquid that floats on the surface, and which is directed to be separated during the process, is probably *valerianic aldehyde.* The valerianate of soda thus obtained is in white fragments which are soluble in water; they have a feeble odour of valerian, and a mawkish taste.

THERAPEUTICAL EFFECTS.—Valerian is a stimulating antispasmodic, its action being particularly manifested on the cerebral organs;

thus, when given in large doses, it produces head-ache, loss of vision, and vertigo. It was formerly used as a remedy in rebellious intermittents, and in adynamic fevers, but in the present day it is only employed as an antispasmodic, and opinions differ much with respect to its efficacy as such. My own experience leads me to place much reliance on it in the treatment of aggravated cases of hysteria, which so often bear a close resemblance to epilepsy, and also in many nervous affections ; however, I have always remarked that it soon loses its antispasmodic powers, even though the dose be increased. It is unquestionable that some of the salts of valerianic acid are more certain in their operation than the preparations of the herb, and will therefore, probably, ere long displace the latter from our list of therapeutic agents.

DOSE AND MODE OF ADMINISTRATION.—In powder, ʒss. to ʒj. ; of the oil, min. iij. to min. v. Valerianate of soda has been introduced into the Dublin pharmacopœia, it would seem for the preparation of the other officinal valerianates, but it may be given in doses of from gr. ss. to gr. j. or gr. ij.

Infusum Valerianæ, D. L. ("Valerian root, bruised, ʒij.; boiling water, f℥ix.; digest for an hour in a covered vessel, and strain ; the product should measure about f℥viij.," D. "Valerian, ℥ss.; boiling distilled water, Oj.; macerate for half an hour in a close vessel and strain," L.) Dose, f℥j. to f℥ij.

Tinctura Valerianæ, D. L. E. ("Valerian root, bruised, ℥v. ; proof spirit, Oij.; macerate for fourteen days, strain, express and filter," D. "Valerian bruised, ℥v.; proof spirit, Oij.; macerate for seven days, express and strain," L. E. "or prepare by percolation, as for tincture of cinchona," E.) Dose, fʒij. to fʒiv.

Tinctura Valerianæ composita, L. (Valerian bruised, ℥v.; aromatic spirit of ammonia, Oij.; macerate for seven days, express and strain.)—*Tinctura Valerianæ Ammoniata*, E. (Valerian bruised, ℥v.; spirit of ammonia, Oij.; macerate for seven days and strain ; or prepare by percolation.) Dose, fʒj. to fʒij.

INCOMPATIBLES.—The alkalies ; the earthy and metallic oxides ; and salts of iron.

VALERIANAS AMMONIÆ. *Valerianate of Ammonia.*

This salt has been recently a good deal employed in medicine in consequence of a favourable report made upon it by several French physicians. It is obtained directly by saturating carbonate of ammonia with a slight excess of oily valerianic acid. This solution is placed alongside a vessel containing very concentrated caustic ammonia, under a bell-glass closely luted. When the saturation is complete, the valerianate of ammonia crystallises in concentric rays. These should be most carefully dried without exposure to the air and kept in a closely stopped bottle. When thus carefully prepared valerianate of ammonia is in the form of minute, pearly white, deliquescent crystals, with a sweetish taste and a well marked odour of valerianic acid. It is a neutral salt, but a concentrated solution in water, in which it is very soluble, soon becomes acid on exposure to the air. It is soluble also in alcohol ; and a pretty certain test that it does not contain free valerianic acid is its complete and ready solubility in both alcohol and water.

This preparation has been too recently introduced into medicine to permit a very decided opinion being given as to its therapeutic value. It is as may be anticipated from its composition a stimulating antispasmodic, but in any cases in which I have employed it, the valerianate of ammonia did not appear to possess properties so superior to the other salts of valerian as to compensate for the difficulty of its preparation and the uncertainty of its composition. The dose of it is from gr. j. to gr. v. dissolved in from f℥ij. to f℥iv. of water and sweetened with sugar ; but that it may be given in much larger doses is evident from the fact that in experiments tried upon dogs so much as ʒiiss. did not produce any injurious effects.

M. Pierlot, who was the first to introduce this preparation into pharmacy states that it should be always prepared and kept in solution as follows:—Distilled water, ninety-five parts ; valerianic acid, three parts ; carbonate of ammonia sufficient to saturate the acid ; mix, and then add of the alcoholic extract of valerian, two parts. He adds the extract to prevent the salt undergoing decomposition. The dose of *Pierlot's* solution of valerianate of ammonia is from min. v. to fʒss. diluted largely.

VALERIANAS FERRI, D. *Valerianate of Iron.*

PREPARATION.—Valerianate of Soda, five ounces and three drachms; sulphate of iron, four ounces ; distilled water, one pint : let the sulphate of iron be converted into a persulphate, as directed in the formula for *ferri peroxydum hydratum*, and by the addition of distilled water, let the solution of the persulphate be augmented to the bulk of eight ounces. Dissolve the valerianate of soda in ten ounces of the water, then mix the two solutions cold, and, having placed the precipitate which forms upon a filter, and washed it with the remainder of the water, let it be dried by placing it for some days rolled up in bibulous paper, on a porous brick. This preparation should be kept in a well stopped bottle.

PHYSICAL PROPERTIES.—Valerianate of iron, thus prepared, is in the form of a reddish-brown, dull powder, accreted into small porous masses. It is nearly tasteless, but has a very strong, disagreeable, valerianic odour.

CHEMICAL PROPERTIES.—It is composed of three equivalents of sesquioxide of iron, seven of valerianic acid, and two of water, (Wittstein.) It is insoluble in water, but is soluble in alcohol ; heated, the valerianic acid is driven off, and sesquioxide of iron left. Valerianate of iron is not a permanent compound, for if exposed to the air the acid evaporates rapidly, and the salt undergoes decomposition; this effect is produced more rapidly by the addition of any of the stronger acids.

ADULTERATIONS.—Owing to the high price at which they were sold, all the valerianates were much adulterated; but as the process proposed by the Dublin College for their preparation yields them at a cheap rate, this sophistication is no longer to be so much apprehended. The purity of the valerianate of iron may be readily ascertained by its chemical and physical properties as given above.

THERAPEUTICAL EFFECTS.—This preparation has not been much employed in medicine hitherto, nor do I think that it is likely to come into general use, in consequence of its disagreeable odour and the facility with which it undergoes decomposition. Its effects are nearly similar to those of the valerianate of zinc, but my experience of it is not very favourable.

DOSE AND MODE OF ADMINISTRATION.—In pill made with liquorice powder and mucilage, half a grain to one grain three times a day.

INCOMPATIBLES.—All acids; and the astringent vegetable extracts.

VALERIANAS QUINÆ, D. *Valerianate of Quina.*

PREPARATION.—Muriate of quina, seven drachms; valerianate of soda, one hundred and twenty-four grains; distilled water, sixteen ounces; dissolve the valerianate of soda in two ounces, and the muriate of quina in the remainder of the water, and, the temperature of each solution being raised to 120°, but not higher, let them be mixed, and let the mixture be set by for twenty-four hours, when the valerianate of quina will have become a mass of silky acicular crystals. Let these be pressed between folds of blotting paper, and dried without the application of artificial heat. Instead of weighing out seven drachms of muriate of quina, and dissolving it in water, as is above prescribed, we may employ the solution of the muriate prepared from an ounce of the sulphate, as directed in the formula for quinæ murias, such solution having been first evaporated to fourteen ounces. It may be observed here, that should it become necessary to evaporate a liquid containing valerianate of quina, care must be taken that its temperature does not rise higher than 120°.

PHYSICAL PROPERTIES.—Valerianate of quina occurs in satiny, crystalline masses of snowy whiteness; the crystals are octohedrons or hexagonal prisms. Its taste is purely bitter, not disagreeable, and it has a very feeble odour of valerianic acid.

CHEMICAL PROPERTIES.—It is composed of one equivalent of quina, one of acid, and twenty-four of water of crystallization. Heated it loses twenty equivalents of water, and is converted into a resinous mass no longer soluble in water: the same effect is produced by its solution in water being kept for some time at a boiling temperature. Valerianate of quina is soluble in water, both proof and rectified spirit, and oils.

ADULTERATIONS.—I must refer to the observations made under this head with respect to the valerianate of iron. The best test for these salts is the addition of dilute hydrochloric acid which disengages from them valerianic acid, readily recognizable by its odour.

THERAPEUTICAL EFFECTS.—This is a very excellent preparation, being not only antispasmodic, but antiperiodic, so that it is specially adapted for those neuralgic diseases which assume an intermittent character. It, therefore fulfils in itself two effects which are so often indicated in this class of diseases, and thus has proved to be a most useful remedy in many neuralgic affections which so frequently baffle the physician's art.

DOSE AND MODE OF ADMINISTRATION.—The dose is from gr. ss. to gr. ij. ; three times a day. In periodic neuralgia a double dose should be given about an hour before the expected occurrence of the attack. As regards the mode of prescribing it, the remarks on valerianate of zinc are equally applicable to valerianate of quina.

INCOMPATIBLES.—Same as for valerianate of zinc.

VALERIANAS ZINCI, D. *Valerianate of Zinc.*

PREPARATION.—Valerianate of soda, two ounces and a half; sulphate of zinc, two ounces and seven drachms; distilled water, one quart: dissolve the valerianate of soda in one half, and the sulphate of zinc in the remaining half of the water, and having raised both solutions to 200°, mix them, and skim off the crystals which are produced. Let the solution be now evaporated at a temperature not exceeding 200°, until it is reduced to the bulk of four ounces, removing as before, the crystals from the surface, in proportion as they form, and placing them with those already obtained. The salt thus procured is to be steeped for an hour in as much cold distilled water as is just sufficient to cover it, and then transferred to a paper filter, on which it is to be first drained, and then dried at a heat not exceeding 100°.

PHYSICAL PROPERTIES.—Valerianate of zinc, when pure, occurs in brilliant, pearly, tabular crystals, of a snowy whiteness. It has a somewhat bitter, slightly astringent taste, and a feeble odour of valerian.

CHEMICAL PROPERTIES.—It is composed of one atom of valerianic acid, and one of oxide of zinc, is soluble in 160 parts of cold and 40 of boiling water, in alcohol, ether, and the oils. Heated to 122° it softens, at 300° it melts and parts with its water of crystallization and a portion of its acid, and at a higher temperature it burns with a strong empyreumatic odour, and is decomposed, a carbonaceous oxide of zinc being left. Valerianate of zinc is very readily decomposed, most acids setting free the valerianic acid and combining with the oxide of zinc. It also undergoes partial decomposition if exposed to the air, or even if kept in badly stopped bottles.

ADULTERATIONS.—As met with in the shops, this salt is often of inferior quality, in consequence either of having been originally imperfectly prepared or of having been badly preserved. When this is the case, it emits a *strong* odour of valerianic acid, and is not completely soluble in water. Most of the valerianate of zinc met with in commerce for some years, especially that prepared in Paris, was nothing more than the butyrate of zinc, to which some oil of valerian had been added; this fraud may be detected by distilling the suspected salt in a glass retort with dilute sulphuric acid and water; on testing the liquid which comes over, with solution of acetate of copper, a bluish-white precipitate will be produced if it be the butyrate, but no change occurs if the salt be the valerianate of zinc. The acetate and other preparations of the metal to which oil of valerian has been added, are also substituted for the valerianate. The substitution may be detected by adding a few drops of dilute hydrochloric acid, by which the valerianic acid will be evolved from the true, but not from a false valerianate.

THERAPEUTICAL EFFECTS.—Valerianate of zinc is a tonic antispasmodic of much power, and as such is peculiarly adapted for the treatment of neuralgic affections, which are so generally dependent on loss of tone in the system. It has been found especially useful in the treatment of facial neuralgia and of vertigo ; but I have seen it prove equally beneficial in most of the protean forms of hysterical neuralgia. It is an excellent remedy in the ordinary convulsive affections of children and young persons of either sex, and when these depend on the presence of worms in the intestines it is peculiarly beneficial, acting indirectly as an anthelmintic of much power. In short, I look on it as a most valuable addition to the Materia Medica, and I fully agree with the observations of Devay, that the chemical combination proves much more beneficial than the oil of valerian and oxide of zinc prescribed together. For some time the remedy had fallen into disrepute, owing to the difficulty of obtaining it pure ; but this has been remedied by the new and cheap process of the Dublin College.

DOSE AND MODE OF ADMINISTRATION.—The dose of it is from three-fourths of a grain to one grain twice or three times a day ; it may be prescribed in the form of pill made with a little mucilage or conserve of red roses, or in solution in orange flower water, or in distilled water flavoured with syrup of orange-flowers. The compounder must bear in mind that the crystals of valerianate of zinc do not dissolve readily in cold water, floating on the surface in consequence of their lightness ; they should, therefore, be first incorporated with a few drops of water in a mortar.

INCOMPATIBLES.—All acids ; the soluble carbonates ; most metallic salts ; and astringent vegetable infusions or decoctions.

CHAPTER IV.

ASTRINGENTS.

(Styptics—Desiccants—Constringents.)

ASTRINGENTS may be defined to be substances which produce contraction and condensation, when they come in contact with living matter. The more immediate effect of astringents is to diminish secretion and excretion ; ultimately they exert a tonic influence on the human body. Hence they appear to be very nearly allied to *Tonics ;* indeed, in many instances, the most powerful tonics will be obtained from the division Astringents. Much difference of opinion exists as to the *modus operandi* of this class of remedial agents. Since the time of Cullen, it has been generally explained by a reference to their action in *tanning ;* for the same substances which, by a peculiar chemical action, harden and condense dead animal matter, operate as astringents on the living system. This hypothesis may, to a certain extent, hold good as to the local action of astringents when applied to a morbidly secreting surface, that is to say, they act by constringing the extreme vessels of the part,—as a direct evidence of which, their effect on the tongue when introduced into the mouth may be referred to. But it will not account for their power in checking discharges from remote parts, when they are introduced into the system through the digestive organs ; in the latter case we must suppose that they produce some peculiar change in the living principle of the structure generally, which is incompatible with excessive secretion or discharge. In cases where the use of astringents is indicated, it will always be necessary, in the first instance, to ascertain the cause by which the morbid discharge is produced, as it often occurs in diametrically opposite states of the system, and therefore very different remedies will in different cases assume the character of an astringent. Thus, where irritability exists, opium, which must be regarded as the type of Narcotics, will often prove the most useful remedy, given either alone or as an adjuvant to some more direct astringent. If a state of plethora of the vascular system exist, bleeding and other depletory measures will be indicated ; or if the discharge, as in some forms of diarrhœa, is caused by acrid or acid matter, emollients or demulcents and antacids must be employed. The prolonged use of astringents diminishes remarkably cuticular transpiration and the secretions from the intestinal mucous membrane, while they seem to exert little influence in lessening that from the kidneys ; in some cases, even an increased discharge of urine follows their administration, which, however, seems to depend upon their effect on the perspiration. When, therefore, it is requisite that they should be employed for any length of time, their administration ought to be occasionally intermitted, and means taken to restore a healthy condition of the various secretions and excretions, the balance of which may have been interfered with : of the various remedies which may be had recourse to with this view, I have found none so efficacious as tepid or cold salt water bathing, according to the circumstances of any individual case ; indeed, in most instances, cold bathing may be advantageously combined with the use of astringents.

Acetum Gallicum, D. Acetum, *(Britannicum)* L. Acetum Gallicum et Britannicum, E. *French vinegar*, D. *British vinegar; impure dilute acetic acid prepared by fermentation from an infusion of malt*, L. *French or British vinegar*, E.

PREPARATION.—Vinegar is an article of the Materia Medica in the three British Pharmacopœias. In France it is prepared from the lighter wines, by exposing them to the air in large wooden vessels placed in a room, the temperature of which is raised to between 68° and 80° F. In Britain, various kinds of malt liquor, cider, raw sugar dissolved in water, &c. are substituted for wine. Of late years, a greatly improved process has been used on the Continent by which vinegar may be made in 36 hours :—Strong alcohol is diluted with five or six parts of water, and about a thousandth part of yeast, honey, or impure vinegar added to it ; the mixture is heated to 75° or 80° and made to trickle slowly through a mass of beechwood shavings, contained in a tall cask, narrowed at the bottom, and pierced with small holes at the top and lower part, to allow a circulation of air ; as soon as the mixture is passed through the barrel three or four times, it is converted into vinegar ; the change being effected by the alcohol absorbing oxygen from the atmospheric air ; the process taking place very rapidly owing to the great surface of the liquid which is exposed.

PHYSICAL PROPERTIES.—Vinegar is of a pale reddish-yellow colour, transparent ; with a sharp, peculiar *(acetous)* odour, and an acidulous, refreshing taste. Specific gravity from 1·006 to 1·009. French, or wine vinegar is generally of a deep colour, and has a more fragrant odour than British, or malt vinegar ; its density also is greater, being from 1·014 to 1·022.

CHEMICAL PROPERTIES.—It is composed of acetic acid, colouring matter, mucilage and water, and a trace of alcohol ; British vinegar contains also sulphuric acid, manufacturers being allowed by law to add a thousandth part by weight of that acid. Wine vinegar may be distinguished from malt vinegar by "ammonia in excess, causing a purplish muddiness, and slowly a purplish precipitate with it," *(Edinburgh Pharmacopœia)*; in addition to the constituents mentioned above, it generally contains some bitartrate and sulphate of potash. The odorous principle of vinegar is conjectured to be acetic ether. Its medicinal virtues depend on the acetic acid it contains.

ADULTERATIONS.—Vinegar varies much in strength, and also frequently contains many impurities. The density, as first shown by *Mollerat,* does not indicate accurately the quantity of acetic acid present, this is more correctly ascertained by its neutralizing power over crystallized carbonate of soda, 144 grains of the salt being equal to 51 grains of real acetic acid. The strongest vinegar prepared, which is termed *proof vinegar,* is estimated to contain five per cent. of real acid. In the application of this test, however, care must be taken to allow for any sulphuric acid present. The impurities most commonly met with in vinegar are metallic matter, generally copper or lead ; some acrid vegetable substance, as capsicum, grains of paradise, etc. ; and sulphuric acid. If the colour be altered on the addition of sulphuretted hydrogen, it contains metallic matter ; the presence of an acrid substance may be detected by the taste, the vinegar having been first neutralized with carbonate of soda ; the quantity of sulphuric acid contained is indicated by the extent of the precipitate produced with solution of chloride of barium or nitrate of baryta. The following are the characteristics and tests given by the London College for the purity of British vinegar :—"Of a brownish colour, with a peculiar odour ; specific gravity, 1·019. f℥j. is saturated by ʒj. of crystallized carbonate of soda. Ten minims of the solution of chloride of barium having been added to an ounce of vinegar, no precipitate is occasioned by a further addition of this solution. The colour is not changed by hydrosulphuric acid."

THERAPEUTICAL EFFECTS.—Vinegar is an excellent refrigerating astringent, and as such is employed with much benefit in hemoptysis, in hematemesis, and in the colliquative sweating of hectic ; taken largely diluted with water, as the usual drink of the patient, it will seldom fail to diminish the excessive discharges. As a local astringent it is used to check hemorrhage from the nose, from the uterus, from hemorrhoidal tumours, and from ulcers ; in intestinal hemorrhage, enemas containing vinegar have been employed with much advantage, particularly when the bleeding proceeds from the large intestines. In relaxation of the uvula and tonsils, it forms an excellent addition to astringent gargles ; and, diluted with water, it is beneficially employed as a collyrium in chronic ophthalmia. Finally, in poisoning with the alkalies, or alkaline carbonates, vinegar is one of the best antidotes that can be employed ; but in poisoning with most other substances, for which at one time it was very generally used, its administration is in general productive of mischief. (See *Refrigerants.*)

DOSE AND MODE OF ADMINISTRATION.—fʒij. to f℥ss. For an enema, f℥j. to f℥ij. diluted with f℥ij. to f℥iv. of water. As a drink in hectic, f℥iij. diluted with Oiss. of distilled water may be taken in the course of the day.

Acidum Aceticum dilutum, D. L. ("Take of acetic acid of commerce, specific gravity 1·044, Oj. ; distilled water, Ovij. ; mix. The specific gravity of this acid is 1·006," D.—" Acetic acid, f℥xxiij. ; distilled water, Oj. ; add to the acid sufficient water to fill a pint measure, and mix. Specific gravity, 1·008 ; f℥j. is saturated by gr. lvij. of crystallized carbonate of soda," L.)—*Acetum distillatum*, L. E. (" Take of vinegar, cong. j. ; let Ovij. distil in a sand bath ; specific gravity, 1·0065 ; f℥j. is saturated by gr. lvij. of crystallized carbonate of soda," L. " Take of vinegar, (French by preference), 8 parts ; distil over with a gentle heat, 7 parts ; dilute the product, if necessary, with distilled water, till the density is 1·005," E.) These preparations are preferred to common vinegar, in consequence of their more equable strength, for external use in lotions, eye-washes, etc. For internal use the French vinegar should be preferred.

Oxymel, D. L. (" Clarified honey, *by weight*, ℔j. ; acetic acid of commerce specific gravity 1·044, f℥iij. ; mix the acid with the honey previously heated," D. " Acetic acid, f℥vij. ; distilled water, f℥viij. ; honey, ℔v. ; mix the the acid added to the water with the honey previously made hot," L.) An excellent addition to gargles.

Antihectic Mixture, AUTHOR.—(Distilled vinegar, f℥ij. ; laurel water, f℥ij. ; simple syrup, f℥vj. ; distilled water, f℥v. ; mix.) Dose, f℥j. to f℥ij. every third or fourth hour. An excellent mixture in the profuse sweating of hectic.

ACIDUM GALLICUM, D. L.—*Gallic acid. An acid prepared from Galls*, L. A peculiar acid developed in nutgalls, by the decomposition of tannin, under the influence of air and moisture. It is an article of the materia medica in the London Pharmacopœia.

PREPARATION.—*Dublin:* " Galls in coarse powder, one pound ; distilled water as much as may be necessary : having placed the galls in a porcelain dish, pour on as much water as will convert them into a thick paste, and keep them in this moistened condition for six weeks, at a temperature of between 60° and 70°, adding water from time to time, so as to supply what is lost by evaporation. Let the residue be boiled for twenty minutes, with forty-five ounces of water, and then placed on a calico filter. The filtered solution, on cooling, will afford a copious precipitate. Let this be drained on a calico filter, then subjected to strong expression, after having been first enveloped in blotting paper, and again dissolved in ten ounces of boiling water. When, upon ceasing to apply heat, the solution has cooled down to 80°, pour it off from the crystals which have formed, and, having washed these with three ounces of ice-cold water, dry them, first on blotting paper, and finally by a steam or water heat. By boiling the undissolved portion of the galls with forty-five additional ounces of water, filtering into a capsule containing the liquor decanted from the crystals formed in the preceding process, evaporating down to the bulk of ten ounces, and cooling to 80°, an additional quantity of the crystallized acid will be obtained. *Or*,—Powdered galls, one pound ; oil of vitriol of commerce, twenty-six fluid ounces ; water, five pints and fourteen ounces ; steep the galls for twenty-four hours in one pint of the water, then transfer them to a glass or porcelain percolator, and pour on a pint and a half of the water in successive portions. Dilute five ounces of the oil of vitriol with an equal bulk of water, and, when the mixture has cooled, add it to the infusion obtained by percolation, stirring well, so as to bring them into perfect contact. Let the viscid precipitate which forms be separated by a filter, and to the solution which passes through add five ounces more of the oil of vitriol, which will yield an additional precipitate. This being added to that previously obtained, let both be enveloped in calico, and subjected to powerful pressure.

Dissolve the residue in the rest of the oil of vitriol, this latter being first diluted with what remains of the water; boil the solution for twenty minutes, then allow it to cool, and set it by for a week. Let the deposit which has formed at the end of this period be pressed, dried, and then dissolved in three times its weight of boiling water, clearing the solution, if necessary, by filtration, and, when it has cooled down to 80°, decant the liquid from the crystalline sediment which has formed, and wash the latter with three ounces of ice-cold water. Finally, let it be transferred to blotting-paper, and when deprived by this of adhering liquid, let it be dried perfectly, at a temperature not exceeding 212°. The gallic acid obtained by either of the preceding processes may be rendered nearly white, by dissolving it in twenty times its weight of boiling distilled water, and causing the solution to traverse a stratum of prepared animal charcoal spread upon a calico filter. When the liquid passes through colourless it should be evaporated to one-sixth of its volume, and then suffered to cool, in order to the separation of the crystallized acid."

PHYSICAL PROPERTIES.—Gallic acid crystallizes in brilliant, satiny, yellowish-white needles, which are unalterable in the air. It is inodorous, but has a slightly acidulous styptic taste, leaving a sweetish impression on the mouth.

CHEMICAL PROPERTIES.—Its composition in the crystalline state is $C^{14} H^{6} O^{10} + 2 HO$. It is very sparingly soluble in cold water or in ether, requires but 3 parts of boiling water for its solution, and is also very soluble in alcohol. It reddens litmus paper, and forms bibasic salts with oxides. When pure it does not precipitate gelatine, by which characteristic it may be distinguished from tannic acid, but like the latter, it gives a bluish-black precipitate with the sesqui-salts of iron. According to Buchner 7·5 per cent. of gallic acid is produced from galls and from 50 to 60 per cent. from tannin.

THERAPEUTICAL EFFECTS.—Gallic acid is a powerful astringent, its effects being particularly manifested on the urinary organs, which is directly proved by the fact of its presence in the urine of those who have taken it, being, in general, readily manifested by the addition of a sesqui-salt of iron to that secretion, a few hours after the acid has been swallowed. It is, therefore, a remedy of great value in all forms of hemorrhage from the kidneys or bladder, provided no inflammatory symptoms are present, and especially in those forms which are the result of injury. It is also one of our best astringents in hemorrhage from the stomach and bowels, on its efficacy in which I have published some observations in the Dublin Quarterly Journal of Medical Science.* In hemorrhage from the uterus, also, my experience of it is corroborative of the published observations of Professor Simpson of Edinburgh, and Sir C. Locock of London. In albuminuria gallic acid is often productive of decided benefit, checking for a time the progress of the disease; the increased secretion of urine and the quantity of albumen in it being sensibly diminished during its administration. It has been also found very useful where fatty matter is present in the urine, an interesting example of its efficacy in which was published by Dr. Bence Jones of London in the 33rd volume of the Medico-Chirurgical Transactions.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. to gr. v. two or three times a day, in the form of pill, or suspended in water by means of mucilage; in urgent cases this quantity may be given every hour or every second hour. Dr. Jones, in the case above referred to, gave ʒj. of it daily for 53 days.

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* New Series, vol. ix. p. 349.

INCOMPATIBLES.—The sesqui-salts of iron.

ACIDUM SULPHURICUM VENALE, D. ACIDUM SULPHURICUM, L. E.

Commercial sulphuric acid; (Specific gravity, 1·843, L. 1.840, E.*).*
Oil of Vitriol. An acid prepared from sulphur.

PREPARATION.—The method of preparing sulphuric acid is described in all elementary works on chemistry. The Dublin and Edinburgh Colleges have given formulæ for purifying the acid, in order to obtain it free from the impurities usually met with in the commercial sort; it is then termed, *Acidum sulphuricum purum*:—"Oil of vitriol of commerce, any convenient quantity: introduce it into a small plain retort, containing a few slips of platinum foil, and passing the beak of the retort into a Florence flask, which is to be used as a receiver, with the aid of a small charcoal fire or gas-lamp, distil over one-tenth of the acid. This being rejected, and a fresh receiver of the same kind connected with the retort, let the distillation be resumed, and continued until no more than about an ounce of liquid remains behind. The distilled product should now be transferred to, and preserved in a well stopped bottle. The specific gravity of this acid is 1·846," D. "If commercial sulphuric acid contain nitrous acid, heat f℥viij. of it, with between gr. x. and gr. xv. of sugar, at a temperature not quite sufficient to boil the acid, until the dark colour at first occasioned shall nearly or altogether disappear. This process removes nitrous acid. Other impurities may be removed by distillation, which on the small scale is easily managed by boiling the acid with a few platinum chips, in a glass retort, by means of a sand-bath or gas-flame,—rejecting the first half ounce. The density of it is 1·845," E.

PHYSICAL PROPERTIES.—It is a heavy, oily-looking liquid, transparent, colourless when pure (the commercial acid generally has a brownish yellow tinge,) inodorous, with an intensely acid, burning taste; when much diluted with water, the taste is merely styptic.

CHEMICAL PROPERTIES.—It is composed of one equivalent of sulphuric acid $S\,O^3$, and one of water; it boils at 620°, and freezes at —15°. It has a great affinity for water, which it absorbs from the atmosphere; during its combination with water, great heat is evolved, a mixture of 4 parts by weight of strong acid with one of water raises the temperature to near 300°. Sulphuric acid is one of the most powerful acids of chemistry, supplanting nearly all others from their combinations. It chars and destroys most animal and vegetable substances. Its best characteristic is the heavy white precipitate, insoluble in either acids or alkalies, which it produces with solution of the chloride of barium or of nitrate of baryta.

ADULTERATIONS.—If the acid contains water, it will not be of the prescribed density. The impurities usually present in commercial sulphuric acid are sulphate of lead, nitrous acid, and arsenic. Dilution with distilled water precipitates the white sulphate of lead, if it be present; the smallest trace of nitrous acid may be detected by gently pouring over the specimen to be examined a solution of the protosulphate of iron; if nitrous acid be contained in it, a deep red colour will be produced at the line of contact.

The arsenic adulteration can be easily detected by adding the diluted acid to pure zinc in *Marsh's apparatus*, and proceeding as directed for the detection of that substance (see *Arsenic*) ; or by passing a stream of sulphuretted-hydrogen through the dilute acid, when a yellow sulphuret of arsenic will be formed. The following are the characteristics and tests given for sulphuric acid by the London College :—" Colourless and odourless ; specific gravity, 1·843. Mixed with an equal measure of water, it usually lets fall a trifling white precipitate, it emits no vapour of nitrous acid ; diluted with 12 parts of water it does not give a yellow precipitate on the addition of hydrosulphuric acid. 100 grains are saturated by 285 grains of crystallized carbonate of soda."

THERAPEUTICAL EFFECTS.—Sulphuric acid is a most powerful corrosive poison, destroying the animal tissues wherever it comes in contact with them. Properly diluted it is an excellent tonic astringent, and is employed with very beneficial results in all forms of passive hemorrhages, and to check excessive discharges when they are dependent on debility :—Thus, it is used with much advantage in hemoptysis, in epistaxis, in slight but protracted bleedings from the uterus, the stomach, or intestines, and in the colliquative sweating and diarrhœa of hectic. In cases of ordinary diarrhœa, dilute sulphuric acid is in my experience one of the best astringents which can be employed, often succeeding in even the most chronic cases when other remedies have completely failed. It has been also used with the best results to check the premonitory diarrhœa of cholera. In calculous affections, with phosphatic deposits, this acid is administered with much advantage ; and in painter's colic it is very generally employed with benefit, both as a prophylactic of the disease, and as a remedy when the attack is present. As a topical astringent, sulphuric acid, largely diluted, was at one time much used to foul and indolent ulcerations of the mouth and fauces, but in consequence of its liability to injure the teeth, it is scarcely ever employed in such cases at present. The internal use of this acid, if continued for any length of time, is apt to derange the digestive functions, causing cardialgia, griping pains and emaciation.

DOSE AND MODE OF ADMINISTRATION.—In prescribing any of the dilute mineral acids, it is generally recommended that the patient be directed to suck them through a quill, in order to prevent the production of any injurious effect on the teeth ; but Mr. L'Estrange of this city has suggested to me a much more efficacious plan, namely, that a small bit of butter should be rubbed over the teeth, just before the dose is to be taken. This method is of course equally applicable, where other medicines, such as many preparations of iron, iodine, &c. which injure the teeth, are administered,

Acidum sulphuricum dilutum, D. L. E. (" Pure sulphuric acid, f℥j. ; distilled water, f℥xiij. ; mix. Specific gravity, 1·084," D. " Sulphuric acid, f℥xv. ; distilled water, Oj. ; add the acid gradually to Oss. of the water, and then pour over it sufficient water that the entire may fill a pint measure, and mix. Specific gravity, 1·103 ;

f℥j. requires for its saturation 216 grains of the crystallised carbonate of soda," L. "Sulphuric acid, f℥j.; distilled water, f℥xiij.; mix them together. Density about 1·090," E.) It must be remembered that as the pure acid of the Dublin College is stronger than that of Edinburgh, as indicated by its density, the dilute acid must also be stronger; the specific gravity of the London preparation indicates that it is more concentrated than that of either of the other colleges. The dose is from min. x. to min. xl., in from f℥ss. to f℥j. of distilled water, to which some *simple* mucilage may be added if thought necessary. It is often prescribed in the infusion of roses.

Acidum sulphuricum aromaticum, D. E. ("Rectified spirit, Oiss.; pure sulphuric acid, f℥iiiss.; ginger bruised, ℥j.; cinnamon bruised, ℥iss.; upon the spirit, placed in a stoppered bottle, pour the acid gradually, and shake so as to produce a uniform mixture. Then add the cinnamon and ginger, and macerate for a week, with occasional agitation. Lastly, filter through paper, and preserve in a well-stopped bottle. The specific gravity of this preparation is ·974," D. "Sulphuric acid of commerce, f℥iiiss.; rectified spirit, Oiss.; cinnamon, bruised, ℥iss.; ginger, bruised, ℥j.; add the acid gradually to the spirit, let the mixture digest at a very gentle heat for three days, in a close vessel. Add the powders, digest for six days more, and then strain: or the mixed powders may be moistened with a little of the acid spirit, and after twelve hours the powders may be exhausted by percolation with the rest of the spirit," E.) This preparation is used in the same cases as the dilute sulphuric acid, for which it forms an agreeable substitute. Dose, min. xx. to min. xxx. in a wine-glass of water.

INCOMPATIBLES.—The alkalies and their carbonates; most metals, and their oxides; some of the earths, and their carbonates; acetate of lead; chloride of calcium; chloride of barium; nitrates; alcohol, and consequently all tinctures; organic substances; essential oils; and the vegetable astringent infusions or decoctions.

In poisoning with this acid, the best antidotes are the alkaline bicarbonates, or carbonate of magnesia. Chalk and magnesia, though generally recommended should not be employed, as with the former sulphate of lime is formed, and the combination of sulphuric acid with the latter produces a considerable degree of heat. External parts burned with it should be washed with soap and water.

Acidum Tannicum, D. L.—*Tannic acid; Quercitannic acid; Tannin; An acid prepared from galls*, L. A peculiar principle on which the astringent property of vegetable substances chiefly depends.

PREPARATION.—Tannic acid is an article of the Materia Medica in the London Pharmacopœia. The Dublin College directs it to be prepared as follows: "Galls in tolerably fine powder, ℥viij.; sulphuric ether, Oiij.; distilled water, ℥v.; incorporate the water and ether by agitation, and pour the resulting solution in successive portions upon the galls, previously introduced into a glass or porcelain percolator. The liquid which accumulates in the lower bottle will consist of two distinct strata, the heavier of which is to be separated, and evaporated to dryness, finally applying an oven heat, which, however, should not exceed 212°. From the lighter liquid the ether may be recovered by distilling it by means of a water bath, and with the aid of a Liebig's condenser."

PHYSICAL PROPERTIES.—Thus obtained, tannic acid is a yellowish-white, uncrystallizable solid, shining and pulverulent; inodorous; with a purely astringent taste, void of all bitterness.

CHEMICAL PROPERTIES.—Its composition is $C^{54} H^{22} O^{34}$. Exposed to the air, it absorbs oxygen, and is almost entirely converted into *gallic acid.* Tannic acid is very soluble in water, moderately so in alcohol or proof spirit, and but very sparingly soluble in ether. It is insoluble in the fixed and volatile oils; but is very soluble in glycerine, which is taken advantage of with excellent results in prescribing. Its solution reddens litmus paper. Its most remarkable property is, that it does not affect the protosalts of iron, but gives a dark blue precipitate with the salts of the peroxide of that metal.

ADULTERATIONS.—Tannic acid is not liable to adulteration, but by long keeping, especially if exposed to the air, it is apt to be converted into gallic acid, a change which may be readily detected by its characteristic property of causing a white precipitate in a solution of isinglass, from which gallic acid throws down nothing. This is the test for its purity proposed by the London College.

THERAPEUTICAL EFFECTS.—Tannic acid is the most powerful of all vegetable astringents, and has been employed with much success in the treatment of the various forms of atonic hemorrhage, and in chronic mucous discharges; it has been found peculiarly efficacious in menorrhagia, and in the colliquative sweating and diarrhœa of hectic. Tannin forms insoluble compounds with the gastric juice and other matters found in the stomach, and should therefore be used with caution in dyspeptic habits. From its chemical action on gelatine, tannic acid has been recently proposed by Dr. Osborne as a direct anthelmintic, and has been successfully used by him with this intention. Applied externally in the form of ointment and of lotion, I have derived much benefit from its use in the treatment of various diseases of the skin, especially those attended with much discharge, as some of the forms of eczema, herpes, &c. A lotion of 4 parts of tannin, dissolved in 30 parts of water, is an excellent application to open cancer, more especially in cases attended with hemorrhage. A saturated solution in glycerine applied two or three times daily will be found one of the best local applications in ulcerated sore throat.

DOSE AND MODE OF ADMINISTRATION.—Gr. ss. to gr. j. or gr. ij., in the form of pill, or dissolved in water. For a gargle, injection, or lotion, gr. v. to gr. viij. of tannin may be dissolved in f℥j. of water; or if a stronger solution be required, gr. xx. may be readily dissolved in fʒj. of glycerine ; for an ointment, from gr. viij. to ʒss. may be combined with ℥j. of white wax ointment, cold cream, or cucumber cerate.

INCOMPATIBLES.—The mineral acids ; the alkalies, and their carbonates ; lime water ; acetate of lead ; nitrate of silver ; the persalts of iron ; tartar emetic ; the vegetable alkaloids ; gelatin ; and emulsions.

ALUMEN, D. L. E. ALUMINÆ ET POTASSÆ SULPHAS, D. L. *Alum ; Sulphate of alumina and potash.*

PHYSICAL PROPERTIES.—As met with in the shops, alum is in transparent, colourless, crystalline masses, void of odour, having a sweetish, astringent taste. Specific gravity, 1·700. By solution and crystallization it may be readily obtained in regular octahedres.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of sulphate of potash, 1 of tersulphate of alumina, and 24 of water. ($KO, SO^3 + Al^2 O^3, 3 SO^3 + 24 HO$). The crystals effloresce slightly in the air ; heated, they fuse in their water of crystallization, all of which they part with, and are converted into a light porous mass, known as *dried* or *burned alum.* Alum dissolves in 18·36 parts of cold water, and in 0·75 parts of boiling water : the solution is decidedly acid. By a red heat alum is deprived of most of its sulphuric acid, and converted into a mixture of sulphate of potash and pure alumina.

THERAPEUTICAL EFFECTS.—Alum is a powerful astringent, and as such is employed with benefit in the treatment of many diseases, both as a general and topical remedy. Administered internally, it is found useful in the treatment of chronic diarrhœa and dysentery, in atonic mucous discharges, in passive hemorrhages, in the colliquative sweating of hectic, &c. In *pyrosis*, given in large doses frequently repeated, it has proved very successful in the hands of many practitioners ; and it has, also, when given in full doses combined with opium, been found to be an excellent remedy in the treatment of painter's colic. As a topical astringent, it is employed to arrest bleeding from minute vessels, as in epistaxis, in menorrhagia, in hemorrhage from leech bites, &c. *Dried alum*, in fine powder, is an excellent application in the early stages of the inflammatory sore throat of scarlatina, measles and small-pox, and in diphtheritis ; it is best applied by insufflation, that is, by placing a small portion of it in an open glass tube, and blowing it into the throat. Dissolved in water, alum is also used with much advantage as a gargle in relaxation of the uvula and tonsils, in chronic ulcerations of the mouth and fauces, and in excessive salivation ; as a collyrium, in chronic ophthalmia ; and as an injection in gleet and fluor albus.

DOSE AND MODE OF ADMINISTRATION.—*Internally*, gr. x. to ʒss. in powder, or made into pill with extract of liquorice, or it may be given in solution in some aromatic water.

Pulvis aluminis compositus, E. (Alum, ℥iv. ; kino, ℥j. ; mix them and reduce them to fine powder.) A useful astringent in chronic diarrhœa, and in passive hemorrhages from the stomach and bowels. Dose, gr. xij. to ℈ij. It has been also applied externally to flabby, ill-conditioned ulcers.

Alum whey, (Alum, powdered, gr. x.; new milk, f℥ij.; boil together for ten minutes, and strain to separate the curd.) Sufficient for one dose.

Externally, gr. xxx. to ʒij. dissolved in Oj. of water.

Cataplasma aluminis, (Agitate together, so as to form a coagulum, the whites of two eggs and a drachm of alum.) This preparation has been omitted from the last edition of the Dublin Pharmacopœia; applied to the eye between two folds of linen, it is highly esteemed by many practitioners for the treatment of chronic or purulent opthalmia.

Alumen siccatum, D. *Alumen exsiccatum,* L. E. ("Take of alum any convenient quantity: liquefy it in a porcelain capsule, over a gas-lamp or open fire, and continue the heat until vapour ceases to be disengaged. Let the residue be then reduced to a fine powder, and preserved in a well-stopped bottle," D. "Take of alum, ℔j.; melt the alum with fire, then let the fire be increased until the ebullition has ceased," L. "Take any convenient quantity of alum; fuse it over the fire in an earthen or iron pot, continue the heat till the ebullition ceases; then reduce it to powder," E.) For external use only.

Liquor aluminis compositus, L. (Alum; and sulphate of zinc, of each, ℥j.; distilled water, Oiij.; rub the salts together; dissolve in the water, and strain.) An excellent astringent lotion, collyrium, or injection.

Hemostatic solution, PAGLIARI. The chief ingredient in this solution being alum, the formula for its preparation is given here. It possesses the property of instantaneously coagulating the blood and converting it into a thick, homogeneous and consistent clot; it is, therefore, a very powerful styptic, and when applied locally constitutes one of the most certain means of checking hemorrhage. (Take of benzoin, eight ounces; sulphate of alumina and potash, one pound; water ten pounds. Boil together in a glazed earthen vessel for six hours, constantly stirring the resinous mass, and supplying the loss by evaporation by successive additions of hot water, so as not to interrupt the ebullition. Finally, filter the liquid, and preserve it in well-stopped glass vessels. The portion of benzoin which remains undissolved will be found to have lost its odour and inflammability.) The hemostatic water thus obtained is limpid, of a very pale wine yellow colour, has a slightly styptic taste, and a sweetly aromatic odour. It leaves, on evaporation, a transparent deposit, which adheres to the sides of the vessel.

INCOMPATIBLES.—Alkalies, and their carbonates; lime and magnesia, and their carbonates; tartrate of potash; acetate of lead; salts of mercury; vegetable extractive matter; and substances containing tannin.

CATECHU, D. L. E. *Catechu. Extract of the wood of Acacia catechu; The leaves of Uncaria gambier (Roxburgh Fl. Indica) furnish the variety of Catechu known in commerce as Terra Japonica*, D. *Extract of the inner wood of Acacia catechu, or an Extract from the leaves of Uncaria gambir*, L. *Extract of the wood of Acacia catechu,—of the kernels of the Areca catechu,—and of the leaves of Uncaria gambir,—probably too from other plants*, E. *Acacia catechu* is a native of several parts of the East Indies; it belongs to the Natural family *Leguminosæ (Fabaceæ*, Lindley), and to the Linnæan class and order *Polygamia Monœcia. Areca catechu* inhabits most of the Indian continent and islands; it belongs to the Natural family *Palmaceæ*, and to the Linnæan class and order *Monœcia Hexandria. Uncaria gambir* is a native of many of the islands of the Indian Archipelago; it is placed in the Natural family *Cinchonaceæ*, and in the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—*Acacia catechu;* Stem, 15–20 feet high, with a brown, scabrous bark, and a hard, heavy wood, dark-red in the centre; Flowers, numerous, pale-yellow; Legumes, 8 seeded. *Areca catechu;* a beautiful palm, between 40 and 50 feet high; Leaves, 15 feet in length, crowded at the extremity of the stem; Flowers, in numerous clusters, appearing from among the leaves; Fruit, a handsome orange-coloured ovoid drupe. *Uncaria gambir;* a stout, scandent shrub; Leaves, ovato-lanceolate; Flowers, green and pink, in loose heads, on opposite axillary peduncles.

PREPARATION.—From the Acacia, catechu is obtained by boiling the red heart-wood cut into chips for some hours in water, until the decoction is sufficiently concentrated to become on cooling a tough extract; it is then divided into small masses, and dried slowly in the shade.—In the interior of the fruit of the *Catechu palm* is contained a roundish conical nut, marbled internally brown with whitish veins, commonly known by the name of *betel nut*, and which, with lime and the leaves of the *Piper betel*, constitutes the celebrated masticatory of the East, called *Betel.* These nuts contain a large quantity of tannin, and a decoction of them concentrated and dried forms some of the inferior catechus of commerce.—The leaves of the *Uncaria gambir* are boiled in water immediately after they are pulled from the tree, the decoction concentrated, and run into square or parallelopiped moulds, to constitute the catechu in cubes of commerce. A better quality, however, is procured by bruising the young shoots and leaves in water for some hours until a fecula is deposited; which when inspissated in the sun to the consistence of a paste is dried in moulds of a circular form.

PHYSICAL PROPERTIES.—A great many varieties of catechu occur in commerce, but I shall direct attention only to the two sorts officinal in the Dublin Pharmacopœia, and which are also those most usually met with in druggists' shops, the others being chiefly employed for tanning. 1st.—*Brown Catechu in irregular masses.* This is the produce of the Acacia catechu, it occurs in irregular-shaped, roundish masses, generally covered with rice husks, weighing from three or four ounces to a pound or more each, of a chocolate-brown colour, very friable, with an astringent bitter taste. 2nd.—*Catechu in cubes (Gambier; Terra Japonica; Cubical resinous catechu).* This variety is obtained from the Uncaria gambir; it occurs in cubes, the faces of which are about an inch square; it is of a yellowish-brown colour, with a paler, dull, earthy fracture; is void of odour, but has a very astringent taste, becoming feebly sweetish.

A finer quality is imported in small lozenge-shaped masses, flat on one side, and slightly convex on the other; it is of a pale pinkish-yellow colour.

CHEMICAL PROPERTIES.—The different varieties of catechu consist principally of *tannin*, and of a peculiar acid, which has been named *catechuic acid*, *catechine*, and *resinous tannin*. Their astringency depends on the tannin, of which the finer qualities contain 55 per cent, while some inferior specimens do not yield more than 28 per cent. Catechu does not dissolve completely in boiling water, but when of good quality is almost entirely soluble in alcohol. The watery infusion is of a dark reddish-brown colour, and reddens litmus paper faintly; it gives a blackish precipitate with sulphate of iron.

ADULTERATIONS.—The varieties of catechu are so numerous and different in quality, and many of them are so very impure, that the only satisfactory test of their relative value is to ascertain the quantity of tannin which is contained in them. This may be readily done, by acting on a given weight with ether, evaporating the ethereal solution to dryness, treating the extract thus obtained with cold water, and again evaporating; when the proportion soluble in both ether and water should amount at least to from 38 to 40 per cent of the specimen.

THERAPEUTICAL EFFECTS.—Catechu is a simple, but very efficacious astringent, and is consequently in general use. It may be administered in all cases of increased mucous discharges, where there is no inflammation present. Thus it is employed with benefit in chronic cystirrhœa, in leucorrhœa, in gleet, in chronic catarrh, and in old standing cases of diarrhœa and dysentery, in which it is usually given in combination with opiates. It is also an excellent remedy in passive hemorrhages from the intestines or uterus; as a topical astringent, it is one of the most useful applications in relaxation of the uvula and tonsils, in slight ulcerations of the mouth, and in chaps or excoriations of the nipple in nurses: for the latter purpose the tincture should be applied with a camel's-hair-pencil repeatedly in the course of the day. Public speakers and singers employ catechu lozenges with much benefit as a preventive of hoarseness, and as a remedy when it exists.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒj. in powder, with sugar, or made into a bolus with honey or treacle.

Pulvis Catechu compositus, D. (Take of catechu; kino, of each, two ounces; cinnamon; nutmeg, of each, half an ounce. Reduce each to powder, mix and pass through a fine sieve. When prepared, the powder should be kept in well-stopped bottles.) Astringent and aromatic. Dose, ʒss. to ʒj. or ʒij.

Infusum Catechu, E. *Infusum Catechu compositum*, D. L. ("Catechu in coarse powder, ʒiij.; cinnamon bark bruised, ʒss.; boiling water, f℥ix.; infuse for half an hour in a covered vessel, and strain; the product should measure about f℥viij," D. "Catechu, bruised, ʒvj.; cinnamon, bruised, ʒj.; boiling distilled water, Oj.;

macerate for an hour in a close vessel, and strain," L. "Catechu powdered, ʒvj. ; cinnamon powdered, ʒj. ; syrup, f℥iij. ; boiling water, f℥xvij. ; infuse the catechu and cinnamon with the water for two hours, strain through linen or calico, and add the syrup," E.) Dose, f℥j. to f℥ij. two or three times a day, or the same quantity may be added to an astringent enema.

Tinctura Catechu, D. E. *Tinctura Catechu composita*, L. (" Catechu, in coarse powder, ℥iv. ; cinnamon, bruised, ℥ij. ; proof spirit, Oij. ; macerate for 14 days, strain, express, and filter," D. "Catechu, bruised, ℥iiiss. ; cinnamon, bruised, ℥iiss. ; proof spirit, Oij. ; macerate for 7 days, express the residuum and filter," L. E. "This tincture may also be prepared by the process of percolation, the mixed powders being put into the percolator without being previously moistened with the spirit," E.) Dose, fʒj. to fʒij. ; usually employed as an adjunct to astringent mixtures in diarrhœa.

Confectio Catechu composita, D. (Take of compound powder of catechu, five ounces ; simple syrup, five fluid ounces. Add the syrup gradually to the powder, and mix them well together.) This preparation is introduced in place of the compound electuary of catechu of the former pharmacopœia, from which it differs especially in that it contains no opium. Dose, from ʒj. to ℥ss. It may be added to astringent mixtures or to chalk mixture.

Electuarium Catechu, E. (Catechu, ℥iv. ; cinnamon, ℥j. ; kino, ℥iv. ; nutmeg, ℥j. ; opium, diffused in a little sherry, ʒiss. ; syrup of ginger, reduced to the consistence of honey, Oiss. : pulverise the solids ; mix the opium and syrup ; add the powder, and beat them thoroughly into a uniform mass.) A useful astringent in chronic diarrhœa and dysentery. Dose, ℈j. to ʒij. One ounce contains gr. ij¼ of opium.

Catechu lozenges, PARIS CODEX. (Catechu, 1 part ; sugar, 4 parts ; mucilage of gum-tragacanth sufficient to form into a proper mass, divide into lozenges of gr. x. each.)

INCOMPATIBLES.—The alkalies ; lime water ; salts of iron, and of lead ; gelatine ; and all vegetable substances whose active principle is an alkaloid, as an insoluble tannate of the alkaloid will be formed. Christison, however, states, and I fully agree with him, that it is probable the alkaloidal tannates are sufficiently soluble in the acids of the gastric juice.

CREASOTUM, D. L. E. *Creasote. An oxhydro-carburet, prepared from pyroxylic oil*, L.—Creasote exists in pyroligneous acid, in wood smoke, and in wood tar ; from the latter of which it is usually prepared. Different processes are followed by different manufacturers for the preparation of creasote ; and as they are very complicated, and can only be successfully executed on the large scale, I must refer to some of the modern works on chemistry for an account of them.

PHYSICAL PROPERTIES.—Pure creasote is a colourless, transparent, oily-looking liquid, having a smoky odour, and a bitter, acrid, and somewhat caustic taste. Its specific gravity is 1·066, D. E., 1·046, L.

CHEMICAL PROPERTIES.—It is a compound of $C^{26} H^{16} O^{4}$ (Gorup-Besanez and Ettling.) It boils at a temperature of 397·4°; and is not congealed at —16·6°; at a temperature a little above its boiling point it is decomposed; it is inflammable, and burns with a very sooty flame. Creasote forms two different compounds with cold water; one, a solution of 1·25 parts of creasote in 100 parts of water; the other, a solution of 10 parts of water in 100 of creasote. It mixes with acetic acid in all proportions, as also with alcohol and ether. It coagulates albumen; dissolves most resins; and has a powerful preservative property with respect to animal substances, whence its name is derived, (*κρεας σωζω.*) It is neutral.

ADULTERATIONS.—Creasote, from being badly prepared, frequently contains a number of peculiar principles which exist in tar, and it is commonly adulterated with the fixed and volatile oils; its purity may be known by its being colourless, by its complete solubility in acetic acid, by its density not being too high, and "by its leaving no translucent stain on white filtering paper, when dropped on it, and exposed to a temperature of about 212° for ten minutes;" these are the tests of the London and Edinburgh Pharmacopœias.

THERAPEUTICAL EFFECTS.—As an astringent creasote is chiefly employed externally, but it is also used as an internal remedy with much benefit in some diseases. Its principal uses as such are, as a styptic to arrest hemorrhage, which it does very effectually when the bleeding proceeds from small vessels, as in some forms of hematemesis and of bleeding from the intestines, in cuts or abrasions, from leech bites, or from ulcerated surfaces; in mucous diarrhœa; as an application to indolent ulcers, especially when accompanied by a sanious discharge, or when resulting from a burn, to chronic venereal or phagedenic ulceration, to ulcerated chilblains, in some forms of chronic skin diseases—its efficacy in which, however, has been much overrated, and as an injection in leucorrhœa. It also forms an excellent gargle in obstinate salivation, in the proportion of a drachm and a-half to a pint of liquid. (See also *Sedatives.*)

DOSE AND MODE OF ADMINISTRATION.—Min. j. to min. ij. gradually increased to min. v., dissolved in at least an ounce or an ounce and a-half of water: the dose should be repeated at short intervals. In the external application of creasote in the form of wash, its little solubility in water should be remembered, for if any excess be present, it will float on the surface, and being thus applied directly, may produce an effect very different from what was intended. For a wash, min. ij. to min. vj. may be dissolved in f℥j. of water. Or the following ointment may be employed:—

Unguentum Creasoti, D. L. E. ("Take of creasote, one fluid drachm; oil of white wax, seven drachms: To the ointment, liquefied by a moderate heat, add the creasote, and stir constantly until the mixture concretes, D." "Creasote, fʒss.; lard, ℥j.; rub and mix them," L. "Creasote, f℥j.; axunge, ℥iij.; melt the axunge, add the creasote, stir them briskly, and continue to do so as the mixture concretes on cooling," E.).

CRETA, *Chalk*, (described in the division *Antacids*) is employed as an astringent in the various forms of diarrhœa; its beneficial effects as such depend principally upon its antacid properties, (see p. 8.) Chalk mixture is very generally used as a vehicle for more active astringents. The following preparation is admirably adapted for the simpler forms of diarrhœa, when unattended with inflammation:—

Pulvis Cretæ Opiatus, D. E. *Pulvis Cretæ compositus cum Opio*, L. ("Take of compound powder of chalk, four ounces and seven drachms; opium, in fine powder, one drachm; Mix them intimately and pass through a fine sieve," D. "Compound chalk powder, ℥viss.; opium, powdered, ℈iv.; mix them," L. "Compound chalk powder, ℥vj.; powder of opium, ℈iv.; triturate them together thoroughly," E.) Dose, for adults, gr. xx. to gr. xl.; for children, gr. ij. to gr. x. Forty grains, (D. L.) thirty-seven (E.), of this powder contain one grain of opium.

CUPRI SULPHAS, D. L. E. CUPRI SULPHAS VENALIS, L. *Sulphate of copper. Blue vitriol. Impure sulphate of copper in crystals*, L.

PREPARATION.—It is an article of the Materia Medica in the three British Pharmacopœias. On the large scale it is usually prepared by roasting copper pyrites, *sulphuret of copper*, exposing it to the air and to moisture until it is oxidated, dissolving out the sulphate thus formed, evaporating and crystallizing. The following formula for purifying it for medical use is contained in the last edition of the London Pharmacopœia:—Commercial sulphate of copper, ℔iv.; boiling distilled water, Oiv.; pour the water on the sulphate and apply heat, constantly stirring until it is dissolved; filter the solution while hot, and set it aside to crystallize; evaporate the supernatant liquid poured off, that crystals may again form; then dry them all.

PHYSICAL PROPERTIES.—This salt usually occurs in fragments of large crystals, of the oblique rhombic prism series, semitransparent, of a beautiful blue colour; without odour, but having a styptic metallic taste. Specific gravity, 2·2.

CHEMICAL PROPERTIES.—The crystals are composed of 1 equivalent of protoxide of copper, 1 of sulphuric acid, and 5 of water, $(CuO, SO^3, HO + 4\ HO)$. They effloresce slightly in dry air; at a temperature of 212° they part with 4 equivalents of water; at 400° they become anhydrous and white; and at a red heat they fuse and lose part of their acid. Sulphate of copper is soluble in 4 parts of cold, and in 2 of boiling water; it is insoluble in alcohol. It has an acid reaction.

ADULTERATIONS.—Sulphate of copper is very often adulterated with sulphate of iron; I have seen some specimens which contained nearly 50 per cent. of that salt. In the crystalline state, the fraud may be readily detected with the naked eye. The best chemical test is the addition of ammonia in excess to a solution of the suspected salt, which has been previously boiled with a little nitric acid; should any iron be present, the precipitate at first thrown down will not be completely redissolved.

THERAPEUTICAL EFFECTS.—Sulphate of copper in large doses, if it be not rejected by vomiting, is a powerful irritant poison, producing inflammation of the parts with which it comes in contact, and acting remotely on the nervous system, causing death with coma and convulsions. In small but repeated doses it operates as a tonic and astringent; with the latter intention, it is only employed in chronic diarrhœa and dysentery, in which it will often succeed in checking the discharges, when vegetable astringents completely fail. Externally a solution of sulphate of copper is used with benefit as a stimulating astringent to indolent and ill-conditioned ulcers attended with excessive discharge, as a collyrium in chronic ophthalmia, and as an injection in chronic mucous discharges from the urethra or vagina. In the early stages of gonorrhœa, if the inflammation does not run very high, a weak solution, gr. j. to f℥j. of water, injected three or four times a day, will often succeed in checking the disease. (See, also, *Caustics*, *Emetics*, and *Tonics*.)

DOSE AND MODE OF ADMINISTRATION.—Gr. ss. to gr. ij. or gr. iij. made into pill with conserve of roses. For a lotion, gr. ij. to gr. x. in f℥j. of water. For an injection, gr. j. to gr. iv. in f℥j. of water.

INCOMPATIBLES.—The alkalies and their carbonates; lime water; acetate of lead; nitrate of silver; corrosive sublimate; all the salts of iron except the sulphate, and most astringent vegetables.

In poisoning with this salt, the best antidote is albumen, as the white of egg; and in its absence, wheaten flour. Sugar has also been found beneficial, and iron filings have been recently proposed, so as to precipitate the copper in the metallic state.

ERGOTIN. *Ergotin*, the alcholic extract obtained from Ergot of Rye. The mode of preparation, &c., of this article will be described under the article Ergota in the chapter on Emmenagogues.

M. Bonjean has experimented extensively on the hemostatic powers of *ergotin*; and there can be no doubt, from the result of his observations that, when applied locally, it is a powerful agent in checking hemorrhage. He has found it especially useful when the bleeding proceeds from incised wounds, or from many small vessels, and in all cases when compression cannot be had recourse to, from any cause. His method of employing it is as follows:—The ergotin is dissolved in five or six parts of water in ordinary cases: in three or four parts only, where the hemorrhage is severe; and pieces of lint, saturated in this solution, are applied to the part previously well dried, pressure being maintained with the hand until the blood ceases to flow. Should the bleeding continue, the lint is kept constantly wet with the solution ; the pressure should be firm but not sufficient to interrupt the circulation. The lint should not be removed for three or four days. M. Bonjean has also administered ergotin internally in hemorrhages, in doses of from five to ten grains ; but its effect is not so decided as when it is employed locally. The infusion and tincture of ergot of rye have also proved useful as hemostatics in the hands of some surgeons, but whenever ergotin can be obtained it should be preferred.

FERRI PERNITRATIS LIQUOR, D.—*Solution of the Pernitrate of iron ; Persesquinitrate of iron.*

PREPARATION.—Take of fine iron wire, free from rust, one ounce ; pure nitric acid, three fluid ounces ; distilled water, a sufficient quantity : into the acid, first diluted with sixteen ounces of the water, introduce the iron wire, and leave them in contact until gas ceases to be disengaged. Filter the solution, and to it add as much water as will make its bulk one pint and a-half. The specific gravity of this solution is 1107.

PHYSICAL PROPERTIES.—A transparent liquid of a fine orange-brown colour ; with a weak nitric acid odour, and an acid styptic taste.

CHEMICAL PROPERTIES.—From the solution, large transparent, colourless crystals may be procured ; according to Pelouse, their composition is 2 atoms of peroxide of iron ($Fe^2 O^3$), 3 of nitric acid, and 1½ of water. If kept in a bottle not quite filled, or if exposed to heat, the solution is decomposed, peroxide of iron thrown down and nitrous acid evolved; in which state it is unfit for medical use.

THERAPEUTICAL EFFECTS.—Solution of the pernitrate of iron is an admirable astringent, possessing also tonic properties. It will be found particularly useful in chronic cases of mucous diarrhœa, accompanied by emaciation and loss of appetite ; in such I have derived much benefit from its employment, after many other remedies had failed. It is also one of the best preparations of iron that can be used in the case of strumous children with enlarged mesenteric glands and lienteric diarrhœa, for whom it may be prescribed at the same time with cod liver oil. In many cases of phthisis the ordinary astringents fail in checking the colliquative diarrhœa ; but this preparation, when local inflammatory action does not forbid its use, acts most beneficially, and becomes an important aid to the oil above referred to. There is also another form of diarrhœa, which may be almost termed nervous, that occurs in females of a delicate and weakly habit, in which the solution of pernitrate of iron is very efficacious : this form of the disease, and the effects of this remedy in it, have been most graphically described by the late Dr. Graves, who was the first in this country to call the attention of the profession to this most useful medicine soon after its introduction into practice by Mr. Kerr of Glasgow.* Doctor Montgomery, of this city, informed me that he has used the pernitrate of iron extensively in the treatment of mucous discharges from the vagina, and that in such cases he considers it the best of the ferruginous preparations.

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒj. for adults; min. x. to min xx. for children. It is best given diluted with water and sweetened with *simple* syrup. It may be also administered in the form of enema, in the proportion of fʒij. to f℥iv. of mucilage of starch.

INCOMPATIBLES.—All astringent vegetable infusions, decoctions, or syrups.

FERRI SULPHAS, D. L. E. FERRI SULPHAS GRANULATUM, D. *Sulphate of protoxide of iron; Green vitriol.—Granulated sulphate of iron.*

FERRI SULPHAS VENALIS, L. *Impure sulphate of iron in crystals.*

PREPARATION.—*Dublin.*—"Take of iron wire, or turnings of wrought iron, four ounces; oil of vitriol of commerce, four fluid ounces; distilled water, one pint and a-half. Pour the water on the iron placed in a porcelain capsule, add the oil of vitriol, and, when the disengagement of gas has nearly ceased, boil for ten minutes. Filter now through paper, and, having separated the crystals which, after the lapse of twenty-four hours, will have been deposited from the solution, let them be dried upon blotting-paper placed upon a porous brick, and then preserved in a well-stopped bottle."—*London.*—Commercial or impure sulphate of iron is an article of the Materia Medica in the London Pharmacopœia. The following is the form for purifying it for medical use:—"Commercial sulphate of iron, ℔iv.; sulphuric acid, f℥j.; iron wire, ℥j.; distilled water, Oiv.; mix the acid with the water, add to these the sulphate and the iron, then apply heat and stir frequently until the sulphate is dissolved; strain the solution while hot, and set aside to crystallize; evaporate the solution poured off, that crystals may again form; dry them all." *Edinburgh.*—An article of the Materia Medica. "If the sulphate of iron of commerce be not in transparent green crystals, without efflorescence, dissolve it in its own weight of boiling water, acidulated with a little sulphuric acid; filter, and set the solution aside to crystallize. Preserve the crystals in well-closed bottles." FERRI SULPHAS GRANULATUM, D. "Take of iron wire, or turnings of wrought iron, four ounces; oil of vitriol of commerce, four fluid ounces; distilled water, one pint and a-half; rectified spirit, ten fluid ounces. Pour the water on the iron placed in a porcelain capsule, add the oil of vitriol, and when the disengagement of gas has nearly ceased, boil for ten minutes. Filter now through paper into a vessel containing eight ounces of the spirit, and stir the mixture as it cools, in order that the salt may be obtained in minute granular crystals. Let these, deprived by decantation and draining of the adhering liquid, be washed on a funnel or small percolator with the remainder of the spirit; and, when rendered quite dry by repeated pressure between folds of filtering paper, and subsequent exposure for twenty-four hours beneath a glass bell, over a common dinner-plate half filled with oil of vitriol, let them be preserved in a well-stopped bottle."

PHYSICAL PROPERTIES.—Commonly met with in large transparent, pale bluish-green crystals, the primary form of which is the oblique rhombic prism. They are inodorous, but have an acid, disagreeable styptic taste. Specific gravity, 1·82. The granulated sulphate of iron of the Dublin Pharmacopœia is in minute granular crystals of a greenish-blue tint, like that of beryl.

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* See my edition of Graves' Clinical Medicine, vol. 2, p. 226.

CHEMICAL PROPERTIES.—The crystals are composed of 1 equivalent of protoxide of iron, 1 of sulphuric acid, and 7 of water, ($FeO, SO^3, HO + 6\ HO$). They effloresce slightly in dry air, but if moisture be present, they attract oxygen and become covered with a brownish-yellow crust of the sesquioxide of iron. Heated, they fuse in their water of crystallization, 6 equivalents of which they part with at a temperature of 238° ; at a red heat they are decomposed, the sulphuric acid driven off, and the red peroxide, *colcothar*, left. Sulphate of iron requires for its solution twice its weight of cold water, and three-fourths of its weight of boiling water. The solution reddens litmus paper. It is insoluble in alcohol. The second process of the Dublin College is introduced with the view of affording a salt *perfectly* free from the sesquioxide. It is the method proposed by M. Berthemot, and yields a beautiful preparation, the presence of the rectified spirit preventing any absorption of oxygen from the air during the process of crystallization and drying. Sulphate of protoxide of iron is best preserved in pure alcohol. M. Latour has recently called attention to the fact that the protosulphate of iron may be completely prevented from hyperoxydation by chemically combining it with sugar, with which it crystallizes in a regular manner and of a definite composition, in the form of oblique rhombic prisms of the following composition :—Protosulphate of iron, 54·57 parts ; sugar, 12·93 parts ; and water, 32·5 parts. The formula for the preparation of this *saccharated protosulphate of iron* is given below.

ADULTERATIONS.—The presence of the sesquioxide, which is very common in the commercial salt, is known by the yellowish-brown colour of the crystals. It is often contaminated with copper, which may be readily detected by immersing a polished plate of iron in a solution of the salt, on which the copper will be deposited if any be present.

THERAPEUTICAL EFFECTS.—Sulphate of iron in doses of two drachms and upwards, if it be not rejected by vomiting, is an irritant poison ; but taken in small doses, frequently repeated, it acts as a tonic and astringent ; with the latter intention it is employed in passive hemorrhages, in chronic diarrhœa and dysentery, and in atonic mucous discharges. As a topical remedy it is used to check bleeding from small blood-vessels, and in solution, or in the form of ointment, as an astringent application to ulcers, in chronic ophthalmia, and in chronic discharges from mucous membranes as in leucorrhœa and gleet. On the Continent, it is also very generally employed locally in the treatment of erysipelas, and, it is stated, with most excellent effect ; but those who have used it in this country do not report so favourably of its action. Velpeau was the first who recommended the use of sulphate of iron in this disease ; he employed it both in solution and in the form of ointment. The former, which consists of one part of the salt dissolved in fifteen parts of water, he uses whenever the inflamed parts can be kept covered with lint soaked in it; but when this cannot be conveniently effected, he employs an ointment composed of one part of the sulphate, and three or four parts of prepared lard. I am in the habit of using a weaker ointment than this, from gr. x. to ʒss. mixed with ℥j. of lard or some mild ointment and glycerine, with very great benefit in some pustular diseases of the skin. (See, also, *Tonics.*)

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. v. in pill. For external use, gr. ij. to gr. x. may be dissolved in f℥j. of water.

Ferri sulphas siccatum, D. *Ferri sulphas exsiccatus,* E. ("Take of granulated sulphate of iron, any convenient quantity. Expose the salt in a porcelain capsule to an oven heat not exceeding 400°, until aqueous vapours cease to be given off, and, having then reduced it to a fine powder, preserve it in a well-stopped bottle," D. "Expose sulphate of iron to a moderate heat, in an unglazed earthen vessel, till it become white and perfectly dry," E.) A more convenient preparation for internal use than the crystallized salt; three grains are equal to nearly five of the crystals; Dose, gr. ss. to gr. iij.

Ferri sulphas saccharatum, LATOUR. (Pure protosulphate of iron, 200 parts; crystallized white sugar [sugar candy], 50 parts; boiling distilled water, 130 parts: dissolve the sulphate of iron in 100 parts and the sugar in 30 parts of the boiling water; mix the liquors, filter while hot, dry the crystals, which separate on cooling, between folds of blotting paper, and preserve in a dry bottle. By concentration a fresh quantity of crystals may be obtained.) Dose, gr. j. to gr. viij. in pill or solution.

Pilulæ sulphatis ferri, E. (Dried sulphate of iron, 2 parts; extract of taraxacum, 5 parts; liquorice root powder, 3 parts; conserve of red roses, 5 parts; beat them together into a proper mass, which is to be divided into five grain pills.) Each pill contains ⅔ds of a grain of dried sulphate of iron; Dose, one to three pills.

INCOMPATIBLES.—The alkalies, and their carbonates; nitric acid; lime water; nitrate and tartrate of potash; iodide of potassium; borax; chloride of barium and nitrate of baryta; acetate of lead; the soaps, and all vegetable astringents.

GALLÆ, D. E. GALLA, L. *Galls; Nutgalls; Gall-nuts; The excrescences formed by Diplolepis gallæ tinctorum on the Quercus infectoria,* D. E. *A swelling formed by the Cynips gallæ tinctoriæ on the small branches of Quercus infectoria,* L.—The oak tree from which galls are procured is a native of Asia Minor; it belongs to the Natural family *Cupuliferæ* (*Corylaceæ,* Lindley), and to the Linnæan class and order *Monœcia Polyandria.* Galls are formed on the young branches in consequence of the irritation produced by the puncture of an hymenopterous insect, *Diplolepis* (or *Cynips*) *gallæ tinctorum*, which punctures the bark for the deposition of its eggs.

PHYSICAL PROPERTIES.—Galls vary in size from that of a large pea to that of a cob-nut. They are of a greyish-green colour, tuberculated on the surface, the tubercles and intervening spaces smooth; hollow, and of a yellowish-white colour internally. They have an intensely astringent taste, but no odour. Galls are imported principally from Constantinople and Smyrna, but some are brought from the East Indies. In commerce, two kinds of galls are commonly met with, blue or green galls, and white galls; the former are gathered before the escape of the insect, and are the best; the latter are perforated with a small circular hole through which the insect has escaped, are larger, of a paler colour, but are much inferior in astringency.

CHEMICAL PROPERTIES.—Galls are composed of about 26 per cent. of tannin, with a trace of gallic acid, extractive matter, a compound of pectic acid and tannin insoluble in cold water, and tannates and gallates of potash and of lime *(Berzelius)*. They yield their astringent property to water, proof spirit, alcohol, and ether. Of these, water is the best solvent; the solution gives a curdy precipitate with solution of gelatine (*tannate of gelatine*, the basis of leather,) and a bluish-black precipitate with salts of the sesquioxide of iron (*tanno-gallate of iron*, the basis of ink.)

Galls are not liable to adulteration in the English trade. The London College directs them to be " of a bluish-black colour, heavy, not perforated."

THERAPEUTICAL EFFECTS.—Galls are among the most powerful vegetable astringents we possess, nevertheless they are but seldom employed internally in medicine; and certainly not so much as they should be, if not alone their medicinal activity but their cheapness be taken into account; they may be used in passive hemorrhages, in chronic diarrhœa or dysentery, in gleet and in leucorrhœa. They are the best antidote in poisoning with tartar emetic, and with ipecacuanha, emetina, and the vegetable alkaloids generally. Externally galls are employed as topical astringents in hemorrhoids, in relaxation of the uvula and tonsils, in chronic ulcerations of the mouth and fauces, and in atonic mucous discharges.

DOSE AND MODE OF ADMINISTRATION.—*Internally* in powder, gr. v. to ℈j.

Infusum Gallæ, (Galls, powdered, ʒiv; boiling water, f℥vj. Infuse for two hours and strain.) Dose, f℥ss. to f℥ij.

Decoctum Gallæ, L. (Galls, bruised, ℥iiss.; distilled water, Oij.; boil down to Oj and strain.) Dose, f℥ss. to f℥ij.; useful also as a local astringent for external application.

Tinctura Gallæ, D. L. *Tinctura Gallarum*, E. (" Galls, in fine powder, ℥v.; proof spirit, Oij.; macerate for fourteen days, strain, express, and filter," D. " Galls, bruised, ℥v.; proof spirit, Oij.: macerate for seven days, express, and filter," L. " Powder of galls, ℥ij.; proof spirit, Oj.; this tincture may be made either by digestion or by percolation, as tincture of capsicum," E.) Dose, fʒss. to fʒij.

Externally, ʒij. infused in Oj. of water for a gargle, lotion, or injection.

Unguentum Gallæ, D. (Take of galls, in very fine powder, one drachm; ointment of white wax, seven drachms. Rub the powdered galls with the ointment, until a uniform mixture is obtained.) *Unguentum Gallæ compositum*, L. *Unguentum Gallæ et Opii*, E. (" Galls, finely powdered, ʒvj.; opium, bruised, ʒiss.; lard, ℥vj.; triturate well together," L. " Galls, in very fine powder, ʒij.; opium, in powder, ʒj.; axunge, ℥j.; triturate them together into an uniform mass," E.) The opium in the London and Edinburgh formulæ is esteemed by some an excellent addition to this ointment, but I have often found it cause much irritation when applied to hemorrhoids that were at all inflamed; and another objection to its use in hemorrhoidal affections is, that being introduced within the rectum, it is apt to cause constipation. The addition of from gr. x. to gr. xx. of extract of belladonna to the simple ointment of the Dublin Pharmacopœia will be found much preferable: from the use of this combination, I have seen the best results follow,—the belladonna allaying the irritation which arises chiefly from the spasmodic action of the sphincter ani muscle.

INCOMPATIBLES.—The mineral acids; salts of iron and lead; sulphate of copper; nitrate of silver; carbonates of potash and of soda; lime-water; tartar emetic; and infusions of cinchona, calumba, cusparia, ipecacuanha, opium, etc.

GRANATUM, L.—*The bark of the fruit of Punica granatum*. This tree has been described in the division *Anthelmintics*.

PHYSICAL PROPERTIES.—The fruit-rind is met with in the shops, in arched irregular pieces, reddish-brown and warty on the outside, yellowish within, about a line in thickness; inodorous; with a bitter, astringent taste. The flowers are reddish, and have a weak astringent taste, but no odour; they are not used at present.

CHEMICAL PROPERTIES.—The rind of the pomegranate consists of 18·8 per cent of tannin, 17·1 of mucilage, 10·8 of extractive, 30 of lignin, and a trace of resin. It yields its astringency to both water and alcohol.

THERAPEUTICAL EFFECTS.—Pomegranate-rind may be used as an astringent in the same cases as the other vegetable remedies of this class; its efficacy being judged of by the quantity of tannin it contains; at present it is rarely employed.

DOSE AND MODE OF ADMINISTRATION.—In powder, ʒss. to ʒj.

Decotum Granati, L. (Pomegranate-rind, ℥ij.; distilled water, Oiss.; boil down to one pint and strain.) Dose, f℥ss. to f℥j.

INCOMPATIBLES.—All substances incompatible with tannin.

HÆMATOXYLUM CAMPEACHIANUM, D. HÆMATOXYLON, E. HÆMATOXYLUM, L. *Logwood; Wood of Hæmatoxylon campechianum.*—A native of Campeachy in Central America, now naturalized in Jamaica. It belongs to the Natural family *Leguminosæ* (*Fabaceæ,* Lindley), and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—Stem crooked, about 8 inches in diameter, and 40 or 50 feet high; Leaves large, pinnate; Flowers yellow, in racemes.

PHYSICAL PROPERTIES.—The heart-wood of the tree which is of a dark-red colour, is alone employed, the bark and alburnum being chipped off. It is imported in billets, which are dense and hard, have a feeble agreeable odour, and a sweetish astringent taste.

CHEMICAL PROPERTIES.—Logwood contains a peculiar red, crystalline, bitter principle, which has been named *hæmatin* or *hæmatoxylin,* resin, volatile oil, some tannin, acetic acid, and various salts. *Hæmatin* is often found in the fissures of the wood, in beautiful, large, red crystals. Logwood yields its active principles to both water and alcohol; the solutions are of a fine purple colour, which is changed to violet by the alkalies; with alum, or acetate of lead, a blue precipitate is produced; a dark brown, with the sesquisalts of iron; and a reddish with gelatine. It is consequently very much employed as a dye wood.

ADULTERATIONS.—Various red-coloured woods are substituted for logwood, from which they may be readily distinguished by their not possessing the same agreeable odour.

THERAPEUTICAL EFFECTS.—Logwood is an excellent astringent in chronic diarrhœa and dysentery, for the latter of which it is peculiarly adapted, as, although it checks the excessive discharge, it does not produce constipation. It has been also used in the profuse sweating of phthisis, and in diabetes.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Hæmatoxyli,* D. L. E. ("Logwood, in small chips, ℥j.; water, Oss.; boil for ten minutes in a covered vessel, and strain. The product should measure about eight ounces," D. "Logwood, sliced, ʒx.; distilled water, Oiss.; boil down to Oj.; and strain," L. "Logwood chips, ℥j.; cinnamon in powder, ʒj.; water, Oj.; boil the logwood in the water down to one half, adding the cinnamon towards the close, and strain," E.) Dose, f℥j. to f℥ij.

Extractum Hæmatoxyli, L. E. ("Logwood, in chips, ℔iiss.; boiling distilled water, cong. ij.; macerate for 24 hours, then boil down to cong. j.; strain while hot, and evaporate to a proper consistence," L. "Logwood, in fine chips, ℔j.; boiling water, cong. j.; macerate for 24 hours, then boil down to Oiv., and concentrate in the vapour-bath to the due consistence," E.) Not much used; it becomes so hard by keeping, that pills made of it pass through the bowels unchanged. Dose, gr. x. to gr. xxx.

INCOMPATIBLES.—The mineral acids; acetic acid; lime water; tartar emetic; sulphates, and acetates.

KINO, D. E. KINO (*Indicum*), L. *Kino; Concrete exudation of Pterocarpus erinaceus* (the African Kino tree, D.), *and of other undetermined genera and species*, D. E. *Indian Kino; exudation, hardened in the sun, from the incised bark of Pterocarpus marsupium*, L. Various substances have been known in commerce and described as kino; in consequence of which, both the botanical source and the part of the world from whence it was obtained were for a long time wrapped in much obscurity. In the present day, nearly all that is imported is brought from Bombay, a very small quantity only being obtained from the coast of Africa, from whence, however, it was originally altogether procured. The former, East India Kino, is the product of the Pterocarpus marsupium, a native of the Malabar coast, belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley,) and to the Linnæan class and order *Diadelphia Decandria.* The latter, African Kino, is obtained from the Pterocarpus erinaceus, a native of Gambia and Senegal. Botany Bay Kino, sometimes met with also, is the inspissated juice of the Eucalyptus resinefera, a native of Australia and Van Diemen's Land; it belongs to the Natural family *Myrtaceæ.*

BOTANICAL CHARACTERS.—*Pterecarpus marsupium:* A lofty tree, with the outer coat of the bark brown, the inner red, fibrous and astringent; Leaves, bifarious, alternate, leaflets, 5—7 alternate, elliptic, emarginate; Panicles, terminal; Flowers, white, with a yellow tinge; Legumes, long-stalked; Seed, solitary, kidney-shaped.—*Pterocarpus erinaceus:* Leaflets, 11—15, alternate, ovate, oblong, obtuse, or sub-emarginate; Flowers, yellow; Legume, orbicular, membraneous, undulate at the margin.

PREPARATION.—" East India Kino is procured when the tree is in blossom, by making longitudinal incisions in the bark round the trunk of the tree, so as to let the gum ooze down into a receiver formed of a broad leaf, so placed and fixed in the bark as to prevent the gum from falling on the ground. From the leaf it is made to run into a receptacle placed under the leaf to receive the gum. When this receptacle is filled, it is removed, the gum is dried in the sun until it crumbles, and then filled into wooden boxes for exportation," (Brown in Royle's Materia Medica, 3rd edition, page 408.) African Kino is procured from incisions made into the trunk and branches of the tree, whence the juice exudes, and gradually concretes into brittle tears. Botany Bay Kino is obtained in a similar manner.

PHYSICAL PROPERTIES.—Kino occurs in the form of small angular fragments or tears, none of them larger than a pea, opaque, glistening, and of a reddish-black colour. They are very brittle; when chewed they adhere to the teeth, and give the saliva a blood-red colour. They are void of odour, but have an intensely astringent taste.

CHEMICAL PROPERTIES.—Kino is composed of 75 per cent. of a combination of tannin with a peculiar extractive containing catechuic acid, 24 of red gum, and 1 of insoluble matter. It is only very partially soluble in cold or boiling water; but alcohol dissolves nearly two-thirds of it, and is therefore the best menstruum for its administration in medicine.

ADULTERATIONS.—Other astringent substances, which bear a general resemblance to Kino, but are of inferior quality, are frequently substituted for it in commerce; none of them, however, have the same glistening, reddish-black colour, which is so well seen in the smaller fragments of Kino; the sophistication may, therefore, be readily detected by the eye. By employing the same tests as for catechu (see p. 64), the exact amount of tannin contained in Kino may be readily ascertained.

THERAPEUTICAL EFFECTS.—Kino is an admirable astringent, possessing nearly similar properties to catechu, and may be employed in the same diseases. It is generally supposed to be better adapted for menorrhagia and leucorrhœa; and as it is more tonic, owing to the extractive which it contains, it should be preferred where great debility exists.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.

Pulvis Kino compositus, L. (Kino, ʒxv.; cinnamon, ʒss.; dried opium, ʒj.; rub separately to fine powder, and mix.) An excellent astringent in chronic diarrhœa and dysentery; it has been also highly praised in pyrosis; gr. xx. contain gr. j. of opium: Dose, gr. x. to gr. xxx.

Tinctura Kino, L. E. (Kino, in powder, ℥iiiss.; rectified spirit, Oij.; macerate for 7 days, and filter. "This tincture cannot be conveniently prepared by percolation," E.) Dose, fʒj. to f℥ij. Tincture of Kino when long kept is often converted into an insoluble gelatinous mass; no satisfactory reason has been hitherto assigned for this change taking place. It is best prevented by keeping the tincture in small bottles completely filled, so as to exclude the atmospheric air. Notwithstanding the assertion of the Edinburgh Pharmacopœia, it may be readily prepared by percolation, by previously mixing the Kino with equal parts of fine white sand. The compound powder and tincture have been both omitted from the last edition of the Dublin Pharmacopœia.

INCOMPATIBLES.—The mineral acids; carbonates of the alkalies; sulphate of iron; nitrate of silver; acetate of lead; and gelatine.

KRAMERIA, L. E. RHATANIA, D. *Rhatany; The root of Krameria triandria.* A native of Peru; belonging to the Natural family *Polygalaceæ*, and to the Linnæan class and order *Tetandria Monogynia.*

BOTANICAL CHARACTERS.—Stem, shrubby, procumbent; Leaves, villous, silky, oblong, sessile; Flowers, solitary, reddish; stamens, 3, whence the specific name.

PHYSICAL PROPERTIES.—Numerous, long, woody root branches, to which the common root-stock about an inch in length is often attached; they consist of a reddish-brown, smooth bark, nearly an eighth of an inch in thickness, and a yellow, hard, woody centre *(meditullium;)* they are inodorous, the bark has an intensely astringent, somewhat bitter taste, but the woody centre is nearly tasteless.

CHEMICAL PROPERTIES.—The bark of rhatany root consists of nearly 43 per cent. of tannin, a trace of gallic acid, 56 per cent. of gum, extractive, and colouring matter, and a small quantity of a peculiar acid, which has been named *Krameric acid.* It yields its active principles to cold water and to alcohol.

ADULTERATIONS.—True rhatany root has within the last few years become very scarce in commerce, and consequently the roots of other plants which bear a resemblance to it are imported and sometimes offered for sale as rhatany root. Mr. Hanbury of London has recently described two kinds which have been thus substituted,—one a root, chiefly in thick woody pieces, which appears to be an inferior quality of the old sort, and the other a highly astringent root imported from New Granada, and evidently the produce of a distinct species. Occasionally pieces of a yellowish root are found mixed through parcels of the true root. All the spurious roots may be readily detected by their wanting the characteristic beautiful red colour of true rhatany.

THERAPEUTICAL EFFECTS.—Rhatany root is a powerful astringent and tonic, and as such is employed with much benefit in the treatment of chronic diarrhœa and of dysentery, in passive hemorrhages, in menorrhagia, and in atonic mucous discharges. As a topical astringent, it may be applied in the form of powder to indolent ulcers with excessive discharge and as a styptic to arrest hemorrhage, when it proceeds from very small vessels. Rhatany root finely powdered is a constituent of most tooth-powders, it reddens and consolidates the gums, and whitens the teeth.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.

Extractum Krameriæ, E. (Prepared in the same way as extract of liquorice.) Dose, gr. xx. to gr. xl.

Infusum Krameriæ, D. L. ("Take of rhatany root, bruised, half an ounce ; boiling water, nine ounces ; digest for one hour, in a covered vessel, and strain. The product should measure about eight ounces," D. "Rhatany, ℥j.; boiling distilled water, Oj.; macerate for 4 hours in a covered vessel, and strain," L.) Dose, f℥j. to f℥ij. This infusion becomes quite turbid on cooling, and would be better made with cold water by the process of percolation.

Tinctura Krameriæ, D. (Take of rhatany root, in coarse powder, eight ounces ; proof spirit, two pints : macerate for fourteen days, strain, express and filter.) Dose, fʒiss. to fʒij.

INCOMPATIBLES.—All substances incompatible with tannin.

MATICO, D. *Matico; the leaves of Artanthe elongata.* This substance was introduced to the notice of the profession some years ago by Dr. Jeffreys of Liverpool. It is stated by the Dublin College, on the authority of Miquel, to be the leaves of *Artanthe elongata* (*Piper angustifolium*, Ruiz and Pavon), a native of Peru, belonging to the Natural family *Piperaceæ*, and to the Linnæan class and order *Diandria Trigynia.*

PROPERTIES.—The leaves as imported are attached to the stem, and the flowering spike is also often present. They have an aromatic, scarcely astringent taste, and an agreeable aromatic odour, somewhat resembling that of sage. They yield their active principles to water and to alcohol. According to the analysis of Dr. Hodges, Matico consists of a bitter principle *(Maticine)*, and an aromatic volatile oil, soft resin, colouring matter, salts, chlorophylle, gummy matter, and lignin. Two kinds of the herb have been forwarded to this country, the one *green* and the other *yellow*; the latter, which appears to have been gathered when the plant was riper, is much the more active.

THERAPEUTICAL EFFECTS.—This substance is held in high esteem as a styptic and astringent in its native country, and the trials that have been made with it since it was first introduced into England by Dr. Jeffreys, prove that it possesses both these properties. As an astringent it has been employed internally in the same cases as the other vegetable remedies of this class, over which it does not appear to possess any remarkable advantages. I have found the tincture very useful in the treatment of catarrh of the bladder in the aged. It is, however, chiefly as a styptic in external cases of hemorrhage, that it has been lauded; and from the numerous cases that have been published in which it has arrested bleeding from small blood-vessels, as from leech-bites, after the ablation of nævi, from incisions, &c.; there can be no doubt of its being a styptic of much power. Like many other good astringents, however, much employed on its first introduction it has latterly fallen almost into disuse.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.

Infusum Matico, D. (Take of matico leaves, cut small, half an ounce; boiling water, half a pint: infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces.) Dose, from f℥j. to f℥ij. two or three times a day.

Tinctura Matico, D. (Take of matico leaves, in coarse powder, eight ounces; proof spirit, two pints: macerate for fourteen days, strain, express, and filter.) Dose, fʒj. to fʒij. To arrest hemorrhage, the *under* side of the leaf is to be applied to the bleeding surface.

INCOMPATIBLES.—The mineral acids; the alkalies; the sesquisalts of iron; acetate of lead; and the tincture or infusion of galls.

MONESIA.—Under this name an astringent extract was imported into France some years since from South America; it is obtained from the bark of the *Chrysophyllum glycyphlœum* (Casaretti), a native of Brazil, belonging to the Natural family *Sapotaceæ*. The extract is brought over in large cakes which are purified by dissolving them in water, filtering and evaporating; the purified extract is in small fragments resembling kino in appearance, but it has not the peculiar ruby lustre of that substance; the taste is at first sweetish, then astringent and somewhat acrid, and the odour feebly aromatic;

it dissolves readily in water, affording a dull brown, somewhat opaque solution ; is partly soluble in alcohol, and only very sparingly soluble in ether. According to the analysis of MM. Derosne and Henry, it consists of tannin, red colouring matter, glycirrhizine, a peculiar acrid principle which they have named *Monesine*, and various salts.

Like numerous other medicines when first introduced, Monesia was extravagantly lauded as a remedy possessing powerfully astringent properties ; experience has however proved that it is much inferior to either kino or catechu, and it probably may take an intermediate station between these substances, and extract of rhatany. It has been used in all cases where astringents are admissible, both externally and internally, but the disease in which it appears to have been most serviceable is chronic diarrhœa.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. v. to gr. xv.

Tinctura Monesiæ, DONOVAN. (Extract of monesia, ℥j. ; proof spirit, f℥ixss. ; water, f℥ij. ; mix, and when the feces have subsided pour off the tincture.) Dose, fʒj. to fʒij.

Mistura Monesiæ, (Extract of monesia, ℈ij. ; water, f℥viiss. ; compound tincture of cardamoms, f℥ss. ; mix) Dose, f℥ss. to f℥ij. two or three times a day.

INCOMPATIBLES.—Mineral acids ; salts of iron, zinc and lead ; opium ; and sulphate of quina.

PLUMBI ACETAS, D. L. E. *Acetate of Lead ; Sugar of Lead.*

PREPARATION. An article of the Materia Medica in the Dublin and London Pharmacopœias. *Edinburgh.*—" Pyroligneous acid of the density 1034, Oij. ; distilled water, Oj. ; litharge, ℥xiv. ; mix the acid and water, add the litharge, dissolve it with the aid of a gentle heat, filter, and concentrate the solution sufficiently for crystallization on cooling."

PHYSICAL PROPERTIES.—Usually met with in irregular white masses of acicular crystals ; having an acetous odour, and a sweetish astringent taste ; the crystals are right rhomboid prisms with dihedral summits ; density, 2·345.

CHEMICAL PROPERTIES.—Acetate of lead consists of 1 equivalent of protoxide of lead, 1 of acetic acid, and 3 of water, ($PbO, C^4H^3O^3 + 3\,HO$). It effloresces slowly by exposure to the air, losing part of its acetic acid and attracting carbonic acid, thereby becoming partially insoluble. By heat, the salt fuses in its water of crystallization which is all driven off ; and if the heat be increased, decomposition takes place. It is soluble in once and a half its weight of water at 60°, in less of boiling water, and in 8 parts of alcohol. The solution reddens litmus paper.

ADULTERATIONS.—This salt is usually met with in commerce sufficiently pure for medical use. In the Edinburgh Pharmacopœia the following tests are given, by which a hundredth part of impurity may be easily detected —" Entirely soluble in distilled water, acidulated with acetic acid: 48 grains thus dissolved are not entirely precipitated by a solution of 30 grains of phosphate of soda."

THERAPEUTICAL EFFECTS.—Acetate of lead taken in large doses acts as an irritant, causing inflammation of the stomach and intestines, with intense pain and vomiting. In medicinal doses it operates as a sedative-astringent, and as such is employed with benefit in the treatment of disease, where the indication is to lower the circulation, and at the same time check excessive discharges. In all forms of passive hemorrhage it proves singularly serviceable; and when the bleeding is of an active character it may be beneficially employed in conjunction with antiphlogistic treatment. In the autumnal cholera of this country, acetate of lead, combined with opium, is the remedy on which most reliance is to be placed; and this combination has also proved eminently successful in the treatment of the diarrhœal stage of Asiatic cholera, for which it was first proposed by the late Dr. Graves, rarely failing to check the premonitory diarrhœa when administered sufficiently early; in my experience, however, it is not to be relied upon when the disease is fully developed. In chronic diarrhœa and dysentery it also proves serviceable; but for diminishing expectoration, and checking the colliquative sweating and diarrhœa of phthisis, it is much inferior to dilute sulphuric or acetic acid. Acetate of lead precipitates the active principle of the gastric juice, on which account its use should not be too long continued; and for the same reason it should not be employed as an astringent in dyspeptic disorders. As a topical remedy, a solution of this salt is employed with benefit in most forms of superficial inflammation of a phlegmonous character, in ophthalmia, in gonorrhœa, gleet, and leucorrhœa, and in cutaneous eruptions attended with surrounding inflammation. A collyrium of the acetate of lead should not be employed in any form of ophthalmia when the cornea is ulcerated, as it produces an indelible white stain which becomes imbedded in the substance of the cornea; an observation first made by Dr. Jacob. It has been successfully applied in the form of powder to the inner surface of the eyelids in granular ophthalmia.

DOSE AND MODE OF ADMINISTRATION.—Gr. ij. to gr. viij. in the form of pill, every second, third or fourth hour.

Pilulæ plumbi opiatæ, E. (Acetate of lead, six parts; opium, one part; conserve of red-roses, about one part; beat them into a proper mass, which is to be divided into four grain pills.—This pill may be also made with twice the quantity of opium.) This forms a most useful astringent combination; each pill contains three grains of acetate of lead, and half a grain of opium; Dose, two or three pills, three times a day.

Unguentum plumbi acetatis, D. E *Ceratum plumbi acetatis*, L, ("Take of acetate of lead, in very fine powder, one ounce; ointment of white wax, one pound; melt the ointment with a gentle heat; then add the acetate of lead gradually, and stir the mixture constantly until it concretes," D. "Acetate of lead, powdered, ʒv.; white wax, ℥v.; olive oil, Oj.; dissolve the wax, in f℥xviij. of the oil, then to these add gradually the acetate of lead rubbed separately with the remainder of the oil, and stir with a spatula till they unite," L. "Simple ointment, ℥xx.; acetate of lead, in fine powder, ℥j.; mix them thoroughly," E.).A soothing and astringent application to irritable ulcers or excoriated parts.

INCOMPATIBLES.—Hard water; the mineral acids and their salts; citric, tartaric, and carbonic acids, and their salts; the alkalies; lime-water; iodide of potassium; tincture of galls; opium; albuminous liquids; and various vegetable infusions.

When an overdose of acetate of lead has been taken, sulphate or phosphate of soda, and sulphate of magnesia are the best antidotes; their administration should be succeeded by emetics, and afterwards by active purgatives, and opium.

PLUMBI CARBONAS, D. E. *Carbonate of Lead; White Lead; Cerusse.*

PREPARATION.—An article of the Materia Medica. On the large scale it is generally prepared by exposing bars or plates of lead to the fumes of strong acetic, or pyroligneous acid, disengaged from the iron pots in which it is contained, by placing them in a mixture of dung and tanners' refuse. The carbonate forms on the surface of the lead, and is detached by rolling the plates under water. On the continent it is also frequently prepared by transmitting a current of carbonic acid gas through a solution of acetate of lead.

PHYSICAL PROPERTIES.—A heavy, white, obscurely, crystalline powder; sometimes met with in greyish-white, chalk-like masses; inodorous, and tasteless.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of protoxide of lead, and 1 of carbonic acid, $(\mathrm{PbO},\mathrm{CO}^2)$. Exposed to heat it parts with its carbonic acid, and is converted into the yellow oxide of lead. It is insoluble in water, but dissolves in nitric acid with effervescence.

ADULTERATIONS.—Carbonate of lead is very much adulterated: the impurities generally found in it are chalk, sulphate of baryta, and sulphate of lead; the two latter may be detected by their insolubility in dilute nitric acid. The presence of chalk may be discovered by dissolving the suspected specimen in dilute nitric acid, throwing down the lead from the solution by sulphuretted hydrogen, filtering, and adding solution of oxalate of ammonia, when, if any chalk had been present, a white precipitate (oxalate of lime) will be produced.

THERAPEUTICAL EFFECTS.—Carbonate of lead is more apt to produce lead-colic than any other of the preparations of this metal, it is consequently never used internally. Topically it acts as a sedative-astringent, and is employed in the form of ointment to promote the cicatrization of excoriated parts and slight ulcerations. In the form of powder combined with starch I have found it an excellent application in the treatment of chronic eczema, and other diseases of the skin attended with itching and excessive discharge. Spread on leather, it is said to prove useful applied over the seat of the pain in local neuralgia.

Unguentum Plumbi carbonatis, D. E. (" Take of carbonate of lead, in very fine powder, three ounces ; ointment of white wax, one pound : melt the ointment with a gentle heat, then add the carbonate of lead gradually, and stir the mixture constantly until it concretes," D. " Simple ointment, ℥v. ; carbonate of lead, ℥j. ; mix thoroughly," E.)

PLUMBI LIQUOR SUBACETATIS, D. PLUMBI DIACETATIS LIQUOR, L. PLUMBI DIACETATIS SOLUTIO, E. *Solution of Subacetate or Diacetate of Lead ; Gowlard's extract ; Extract of Saturn.*

PREPARATION.—*Dublin.*—" Take of acetate of lead, six ounces ; litharge, in fine powder, four ounces ; distilled water, two pints : dissolve the acetate of lead in the water, and when the solution is raised to its boiling temperature, add the litharge in successive portions, and boil gently for half an hour. Add now as much distilled water as will supply what has been lost by evaporation, and filter through paper into a bottle, which should be furnished with an air-tight stopper. The specific gravity of this solution is 1066." *London.*—" Acetate of lead, ℔ij. ℥iij. ; oxide of lead, rubbed to powder, ℔j. ℥iv. ; distilled water, Ovj. ; boil them for half-an-hour, frequently stirring, and when the liquor is cold, add of distilled water as much as may be sufficient to measure Ovj. ; lastly strain the solution ; and keep in well closed vessels." *Edinburgh*—" Acetate of lead, ℥vj. ʒvj. ; litharge, in fine powder, ℥iv. ; water, Oiss. ; boil together, stirring occasionally ; when the solution is cold, add water, if necessary to make up Oiss. ; and then filter. Preserve the solution in well closed bottles."

PHYSICAL PROPERTIES.—This solution is transparent and colourless ; it has a weak acetous odour, and a sweetish, astringent taste. Specific gravity, 1·066, D, ; 1·260, L.

CHEMICAL PROPERTIES.—It is an aqueous solution of the tribasic acetate of lead, which salt may be obtained in a crystalline form by evaporation ; crystallized subacetate of lead is composed of 1 equivalent of acetic acid, 3 of protoxide of lead, and 1 of water, ($3\ PbO, C^4H^3O^3 + HO$). Exposed to the air it deposits a white precipitate of carbonate of lead ; the same effect is produced by adding a solution of carbonic acid or a carbonate. The solution is powerfully alkaline.

THERAPEUTICAL EFFECTS.—This solution is not used internally ; externally, it is employed, diluted with from 20 to 40 parts of distilled water according to circumstances, in the same cases as a solution of acetate of lead ; the chief advantage it possesses over which is, that it does not dry up so quickly. A very weak solution, from fʒss. to fʒj. to f℥xvj. of distilled or elder-flower water I have found one of the best local applications in the inflammatory stages of eczema and of several other diseases of the skin.

Plumbi subacetatis liquor compositus, D. *Liquor Plumbi diacetatis dilutus*, L. (" Take of solution of subacetate of lead ; proof spirit, of each, two fluid ounces ; distilled water, half a gallon :

mix, filter, and preserve in a well stopped bottle," D. "Solution of diacetate of lead, fʒiss.; distilled water, Oj.; proof spirit, fʒij.; mix," L.) This solution is better prepared extemporaneously, when the spirit may be omitted if thought necessary.

Ceratum Plumbi compositum, L. (Solution of diacetate of lead, fʒvj.; wax, ℥viij.; olive oil, Oj.; camphor, ʒj.; mix the melted wax with f℥xvj. of the oil, then remove them from the fire, and, when first they begin to thicken, add gradually the solution of diacetate of lead, and stir them constantly with a spatula until they cool; lastly, mix with them the camphor dissolved in the remainder of the oil.) *Gowlard's cerate;* employed as a dressing to diminish pain and irritation. This is a most excellent application in the inflammatory stages of many skin diseases.

INCOMPATIBLES.—Same as for acetate of lead; solution of gum; organic matter; and soap liniment.

PLUMBI OXIDUM, L. LITHARGYRUM, D. E. *Fused (partially fused*, D. L.*), protoxide of Lead; Litharge.* Though much employed in pharmacy and the arts, litharge is only used in medicine as a desiccative and astringent powder, to sprinkle over excoriated parts and superficial ulcerations. The following characteristics and tests for its purity are given by the London College:—"Entirely, or almost entirely soluble in dilute nitric acid; this solution is blackened by hydrosulphuric acid. Potash gives a white precipitate with it, which is soluble in an excess of the alkali. Sulphate of soda throws down 135 grains of sulphate of lead from 100 grains of the oxide dissolved in dilute nitric acid." It enters into the composition of the following ointments:—

Emplastrum Lithargyri, D. E. *Emplastrum Plumbi*, L. ("Litharge in a very fine powder, ℔v.; olive oil, cong. j.; water, Oij; boil all the ingredients together over a gentle fire, stirring constantly, until the oil and litharge acquire such consistence that they will solidify on cooling. Towards the close of the process, a little boiling water should be added to supply the place of that which has disappeared," D. "Oxide of lead, reduced to a very fine powder, ℔vj.; olive oil, cong. j.; water, Oij.; boil together over a gentle fire, constantly stirring, until the oil and the oxide unite to the consistence of a melted plaster. It will be necessary to add a little boiling water, if all that which had been used at first is boiled away before the operation is completed," L. "Litharge, in very fine powder, ℥v.; olive oil, f℥xij.; water, f℥iij.; mix them; boil and stir constantly, till the oil and litharge unite, replacing the water if it evaporate too far," E.). *Diachylon plaster.* It is used for retaining the edges of fresh wounds in contact, and as the basis of many other plasters.

Unguentum Plumbi compositum, L. (Lead plaster, ℔iij.; olive oil, f℥xviij.; prepared chalk, ℥vj.; dilute acetic acid, f℥vj.; melt the plaster in the oil with a slow fire; then add first the chalk and afterwards the acid, constantly stirring till they cool.) Generally used as a dressing for indolent ulcers.

Emplastrum Resinæ, D. L. *Emplastrum Resinosum*, E. ("Take of resin, in powder, four ounces; castile soap, in powder, two ounces; litharge plaster, two pounds: to the litharge plaster previously melted over a gentle fire, add the resin and soap, and mix them intimately," D. "Resin, ℔ss.; lead plaster, ℔iij. Add the resin previously melted, to the litharge plaster melted over a slow fire, and mix," L. "Litharge plaster, ℥v.; resin, ℥j.; melt them with a gentle heat, and stir well till the mixture concretes on cooling," E.) The London and Edinburgh preparations constitute the *adhesive* or *sticking-plaster* of the shops, commonly used for retaining the edges of wounds in contact, and for strapping ulcers. That of Dublin is a substitute for the *Emplastrum saponis compositum vel adhærens*, of the pharmacopœia of 1826, and which is usually employed spread on linen as an application to prevent bed-sores.

Emplastrum Saponis, D. L. E. ("Take of castile soap, in powder, four ounces; litharge plaster, two pounds and a half: to the plaster, previously melted over a gentle fire, add the soap, and heat them together, until they are thoroughly incorporated," D. "Soap, sliced ℔ss.; lead plaster, ℔iij.; resin, ℥j.: to the plaster melted over a slow fire, add the soap and resin previously melted; then evaporate all to a proper consistence, stirring constantly," L. "Litharge plaster, ℥iv.; gum plaster, ℥ij.; castile soap-shavings, ℥j.: melt the plasters together with a gentle heat, add the soap, and boil for a little," E.). This plaster when kept is apt to crumble to powder, to obviate which, the London College has added the resin, and the Edinburgh College the gum-plaster. It is chiefly employed to give mechanical support.

Ceratum Saponis compositum, L. (Soap, ℥x.; wax, ℥xiiss.; oxide of lead, powdered, ℥xv.; olive oil, Oj.; vinegar, cong. j.; boil the vinegar with the oxide of lead over a slow fire, constantly stirring them till they unite; then add the soap, and boil again in a similar manner, until all the moisture is evaporated; lastly, mix with these the wax previously dissolved in the oil.) A cooling astringent dressing.

QUERCUS, L. QUERCUS CORTEX, D. E. *Oak-bark; Bark of Quercus pedunculata* (Willdenow).—Indigenous; belonging to the Natural family *Cupuliferæ* (*Corylaceæ*, Lindley), and to the Linnæan class and order *Monœcia Polyandria.*

BOTANICAL CHARACTERS.—A large, long-lived tree; Leaves, bright green, deciduous; Flowers, *male*, yellowish; *female*, greenish tinged with brown; Fruit (acorns), 2 or 3 on a long peduncle, surrounded at the base by the cupule.

PHYSICAL PROPERTIES.—Oak-bark is in pieces of various lengths, silvery-gray on the outside, reddish-brown within; inodorous; taste powerfully astringent ; the pieces are brittle and break with a short fracture.

CHEMICAL PROPERTIES.—It contains from 15 to 20 per cent. of tannin, with some gallic acid, uncrystallizable sugar, pectin, and salts. It yields its virtues to both water and alcohol.

THERAPEUTICAL EFFECTS.—Oak-bark is an excellent astringent ; and may be employed in the treatment of chronic diarrhœa and dysentery, in alvine hemorrhages, and to check atonic mucous discharges. As a topical remedy, it is used with benefit in the form of decoction : as a gargle in relaxation of the uvula and tonsils ; as an injection in fluor albus, and in prolapsus of the uterus or rectum ; and as a local application in reducible hernia to render the sac more tense.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form, ʒss. to ʒj.

Decoctum Quercus, D. L. E. ("Oak-bark, bruised, ℥iss. ; water Oiss.; boil for ten minutes in a covered vessel and strain," D. "Oak-bark, bruised, ʒx. ; distilled water, Oij. ; boil down to a pint and strain," L. E.) Dose, f℥j. to f℥iv. A convenient strength for a gargle, injection, or lotion.

INCOMPATIBLES.—All substances incompatible with tannin.

ROSA GALLICA, D. L. E. *French rose; Red-rose; Petals (the unexpanded petals, both fresh and dried,* L.*) of Rosa gallica.*—A native of the middle and south of Europe, now cultivated extensively in our gardens. It belongs to the Natural family *Rosaceæ*, and to the Linnæan class and order *Icosandria Polygynia.*

BOTANICAL CHARACTERS.—An undershrub, very variable in size and character, owing to cultivation ; the flowers are of a fine purplish-red colour, spreading.

PHYSICAL PROPERTIES.—The dried petals have a velvety appearance, an agreeable roseate odour which is developed during desiccation, and a somewhat aromatic, bitter, astringent taste. They should be gathered before the flowers expand, the white claw cut off, and then dried quickly with a stove heat.

CHEMICAL PROPERTIES.—Red rose petals contain volatile oil, tannin, gallic acid, colouring matter, albumen, fatty matter, and some salts. They yield their properties to boiling water affording a reddish-yellow solution, which is changed to bright red by sulphuric acid.

THERAPEUTICAL EFFECTS.—The petals of the red-rose are very mildly astringent, and are chiefly employed in medicine on account of their colour and odour, the officinal preparations forming agreeable vehicles for the administration of more active medicines.

DOSE AND MODE OF ADMINISTRATION.—*Infusum Rosæ*, E. *Infusum Rosæ acidum*, D. *Infusum Rosæ compositum*, L. ("Take of petals of the Gallic rose, dried, two drachms; dilute sulphuric acid, one fluid drachm; boiling water, half a pint: infuse the petals for one hour in the water, in a covered vessel, strain, and add the acid. The product should measure about eight ounces." D. "Red-rose petals, dried, ʒiij.; dilute sulphuric acid, fʒiss.; sugar, ʒvj.; boiling distilled water, Oj.; pour the water on the rose petals, shred in pieces and put in a glass vessel; then mix in the acid. Macerate for two hours, and strain the liquor, lastly add the sugar to it," L. —The *Edinburgh College* employs the same proportions as the *London;* the petals are to be infused in the water in a covered vessel of glass or porcelain, not glazed with lead, for an hour; the acid added, the liquor strained through linen or calico, and the sugar dissolved in it.) An agreeable refrigerant and mild astringent; Dose, f℥ss. to f℥ij. It forms one of the best vehicles for the administration of the neutral purgative salts. The preparation of the Dublin Pharmacopœia contains more than twice as much acid as that of the former edition, and is also stronger than the infusions of the other British Colleges.

Confectio Rosæ, D. L. *Conserva Rosæ*, E. ("Take of dried petals of the Gallic rose, one ounce; rose-water, two fluid ounces; refined sugar, eight ounces: macerate the petals in the rose-water for two hours, add the sugar gradually, and beat them into a uniform mass. *Or*,—Take of fresh petals of the Gallic rose, three ounces; refined sugar, eight ounces: rub the petals in a mortar, then add the sugar gradually, and beat them together till they are intimately mixed," D. "Red-rose petals, fresh, ℔j.; sugar, ℔iij.; bruise the petals in a stone mortar, then the sugar being added, pound them again until they are thoroughly incorporated," L. "Beat the petals of Rosa gallica to a pulp, gradually adding twice their weight of sugar," E.). A very weak astringent; Dose, ʒj. to ʒij. It is principally used as a basis for pills, for which purpose it is the best material that can be used, as it neither hardens nor becomes candied by keeping. It should not be employed for pills containing a sesquisalt of iron, in consequence of the tannin it contains.

Mel Rosæ, L. E. ("Dried red-rose petals, ℥iv.; boiling distilled water, f℥xxiv.; honey, ℔v.; macerate the petals, previously shred, in f℥xvj. of the water for two hours, then express gently with the hand, and strain; macerate what remains again for a short time in the rest of the water, and pour off the liquor; add to this one-half of the former infusion, setting aside the other half. Then add the mixed liquors to the honey and evaporate in a water-bath, until on the addition of the infusion that was set aside, it will be of a proper consistence," L. "Red-rose petals, dried, ℥iv.; boiling water, Oiss.; honey, ℔v.; infuse the petals in the water for six hours, strain and squeeze; let the impurities subside; pour off the clear liquor, mix with it the honey, and evaporate the whole to the consistence of syrup, removing the scum," E.). Chiefly employed as an addition to astringent gargles; Dose, ʒij. to ʒiv.

Syrupus Rosæ gallicæ, D. E. ("Take of petals of the Gallic rose, dried, two ounces; boiling distilled water, one pint; refined sugar, in powder, as much as is sufficient: boil the petals in the water, in a glass or porcelain vessel, until their colour is completely extracted; strain with expression, and let the decoction stand until the sediment subsides; then, having decanted the supernatant liquor, add to it twice its weight of sugar, and dissolve with the aid of a steam or water heat," D. "Dried red-rose petals, ℥ij ; pure sugar, ℥xx.; boiling water, Oj.; infuse the petals in the water for twelve hours, strain the liquor, and dissolve the sugar in it with the aid of heat," E.). Chiefly used for flavouring and imparting its fine red colour to mixtures, &c.

INCOMPATIBLES.—All substances incompatible with tannin.

SODÆ BIBORAS ; BORAX, D. L E.—*Biborate of Soda ; Borax.*

PREPARATION.—An article of the Materia Medica; on the large scale it is prepared either by refining crude borax of commerce, *Tincal*, a natural crystalline formation, met with on the shores of some lakes in Thibet and Persia; or by saturating native boracic acid, obtained from the lagoons of Tuscany, with carbonate of soda.

PHYSICAL PROPETIES.—Usually met with in large, translucent, colourless crystals aggregated together; the crystals are either oblique rhombic prisms, or regular octohedrons; inodorous; with a somewhat styptic alkaline taste.

CHEMICAL PROPERTIES.—Crystallized borax consists of 1 equivalent of soda, 2 of boracic acid, and 10 of water, ($Na\,O,\ 2\,BO^3 + 10\,HO$); but *octohedral borax* contains only 5 equivalents of water. Exposed to the air it effloresces slowly; heated it melts in its water of crystallization, which if the heat be increased is driven off, and a light anhydrous salt, *calcined borax,* left; at a still higher temperature it fuses again, and as it cools forms a transparent solid, *glass of borax.* Borax is soluble in 20 parts of cold and 6 of boiling water; the solution is alkaline, changing the vegetable blues to green. In solution this salt is readily recognized by adding sulphuric acid, which precipitates boracic acid in pearly crystalline scales.

THERAPEUTICAL EFFECTS.—Borax is employed only as a topical astringent; as such it is used with benefit in aphthous ulcerations of the mouth and throat, in excessive mercurial salivation, and in some forms of chronic skin disease. (See, also, *Diuretics*).

DOSE AND MODE OF ADMINISTRATION.—For a lotion or gargle, gr. xx to gr. xxx. may be dissolved in f℥j. of water; or ʒj. of the following preparation in f℥v. of water.

Mel Boracis, D. L. E. ("Borax, in fine powder, ʒj.; clarified honey by weight, ℥j.; mix," D. "Borax, powdered, ʒj.; honey, ℥j.; mix," L. E.) The best form for applying borax to aphthous ulcerations.

INCOMPATIBLES.—The mineral acids, and most of their salts.

TORMENTILLA, L. E. *Tormentil ; Root of Potentilla tormentilla.* Indigenous ; belonging to the Natural family *Rosaceæ,* and to the Linnæan class and order *Icosandria Polygynia.*

Tormentil-root contains about 18 per cent. of tannin, and consequently is an astringent of some power ; it may be used in the same cases as the other vegetable astringents. At present, however, it is scarcely ever employed, except as a domestic remedy. The dose of the powdered root is from ʒss. to ʒj , three or four times a day. The decoction is a better mode of administering it.

Decoctum Tormentillæ, L. (Tormentil, bruised, ℥ij ; distilled water, Oiss. Boil down to Oj. and strain.) Dose, f℥j. to f℥ij., two or three times a day. It is also an excellent astringent lotion or injection.

INCOMPATIBLES.—All substances incompatible with tannin.

UVA URSI, D. L. E. *Bearberry ; Leaves of Arctostaphylos uva-ursi.* Indigenous ; belonging to the Natural family *Ericaceæ,* and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A small, trailing shrub ; Leaves, obovate ; entire, evergreen ; Flowers, rose-coloured, in terminal racemes ; Berry, globose, scarlet, 4-5 seeded.

PHYSICAL PROPERTIES.—The dried leaves are dark-green, shining, convex above, concave and reticulated on the under surface ; they have a very astringent, somewhat bitter taste, and emit a faint odour in the process of pulverization.

CHEMICAL PROPERTIES.—They contain 36·4 per cent. of tannin, with some gallic acid, resin, extractive, salts, &c. They yield their astringency to water, and to alcohol. A peculiar bitter principle has been recently obtained from the leaves by Kawalier, which has been termed *Arbutin ;* it is crystallizable in long, thin, colourless prisms, is soluble in alcohol, ether and water ; fuses when heated, and solidifies into an amorphous mass.

ADULTERATIONS.—The leaves of the red whortle-berry *(Vaccinium vitis-idæa),* and of the common box *(Buxus semper-virens),* are often either mixed with, or substituted for uva-ursi ; the former are readily distinguished by their under surface being dotted, not reticulate ; and the latter, by their want of astringency.

THERAPEUTICAL EFFECTS.—The employment of uva-ursi as an astringent is now altogether restricted to chronic diseases of the urino-genital apparatus, attended with mucous discharge ; as in the advanced stages of catarrh of the bladder, in gleet, leucorrhœa, &c. To produce any beneficial effects its use must be persevered in for a considerable time. I have found it act very beneficially, combined with dried carbonate of soda and Dover's powder, in chronic albuminous nephritis, when there is excessive secretion of urine.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. xx. to ʒj

Extractum Uvæ ursi, L. (Uva-ursi, bruised, ℔iiss. ; boiling distilled water, cong. ij. ; macerate for 24 hours ; then boil down to a gallon, and strain the liquor while yet hot ; lastly, evaporate to a proper consistence.) Dose, gr. v. to gr. xv. twice or three times a day.

Decoctum Uvæ ursi, D. L. ("Take of uva-ursi leaves, bruised, half an ounce ; water half a pint : boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D. "Uva ursi, ℥j. ; distilled water, Oiss ; boil down to Oj. and strain," L.). Dose, f℥j. to f℥iij.

INCOMPATIBLES.—All substances incompatible with tannin.

ZINCI ACETAS, D. *Acetate of Zinc.*

PREPARATION.—Take of acetate of lead, one pound ; sheet zinc, four ounces ; distilled water, two pints and a half ; solution of chlorinated lime, a sufficient quantity ; dissolve the acetate of lead in the water, and, having placed the solution in a cylindric jar, immerse in it the zinc rolled into a coil. After the lapse of twenty-hours decant the liquid, and having reduced it by evaporation to fifteen ounces, drop into it, while boiling hot, the solution of chlorinated lime, until a reddish precipitate ceases to form. It is now to be cleared by passing it through a filter, then acidulated by the addition of a few drops of acetic acid, and evaporated down to ten fluid ounces, when, upon cooling, crystals will form. These, and any additional crystals obtained by the concentration of the mother liquor, should be dried on blotting-paper placed on a porous brick, and then preserved in a well-stopped bottle.

PHYSICAL PROPERTIES.—This salt occurs in small white, rhomboidal plates, with a pearly lustre; inodorous ; having a bitter, styptic taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of oxide of zinc, 1 of acetic acid, and 3 of water, ($Zn\,O,\ C^4H^3O^3 + 3\,HO$). Exposed to the air it effloresces slowly. It is very soluble in water and in alcohol.

THERAPEUTICAL EFFECTS.—I regard acetate of zinc as one of our best local astringents; it is especially useful in the treatment of skin diseases attended with much discharge whether serous or purulent, such as eczema, lupus, and impetigo, as soon as the acute inflammatory action which attends their first stages has been subdued. I have also found it a most excellent remedy applied in the crystalline state (as the nitrate of silver is used,) once or twice daily to lupoid ulceration, more especially when it is of the serpiginous character and is located on the scalp. Dissolved in spirit or in water, this salt is used as a topical astringent in ophthalmia, and in chronic mucous discharges. In the very commencement of the disease, or if not used then, as soon as the inflammatory symptoms have subsided, it forms an excellent injection in gonorrhœa. It has been but little employed internally, but may be used in the same cases as the sulphate.

DOSE AND MODE OF ADMINISTRATION.—Internally, gr. j. to gr. iij. made into pill with conserve of roses, or dissolved in some aqueous vehicle. For a lotion or injection, gr. ij. to gr. x. may be dissolved in f℥j. of distilled water, and for an ointment, from four to ten grains reduced to fine powder may be rubbed up with an ounce of wax cerate, of cold cream, or of any other mild unguent.

Tinctura Zinci acetatis, (Sulphate of zinc; and acetate of potash, of each, 1 part; rub together and add 16 parts of rectified spirit; macerate for a week, frequently agitating, and filter through paper.) One drachm contains a quantity of the salt nearly equal to four grains of the crystallized acetate; largely diluted with water it forms an excellent cooling, astringent lotion. This preparation has been omitted from the last edition of the Dublin Pharmacopœia.

INCOMPATIBLES.—The stronger acids; the alkalies and their carbonates; and lime water.

ZINCI CARBONAS, D. CALAMINA PRÆPARATA, L. E. *Carbonate of Zinc,* D. *Native carbonate of Zinc, burned, reduced to a very fine powder and elutriated,* L. *Prepared Calamine,* E.

PREPARATION.—Calamine, one of the most common ores of zinc, is an article of the Materia Medica in the Pharmacopœias of the English and Scotch Colleges; it is a very impure carbonate of zinc, and previously to being used for medical purposes is directed to be burned with a red heat, and reduced to fine powder in the same manner as prepared chalk. It then constitutes the officinal *prepared calamine. Dublin*—"Take of solution of chloride of zinc, one pint; crystallized carbonate of soda of commerce, two pounds; boiling distilled water, six pints; to the carbonate of soda dissolved in the water, add the solution of chloride of zinc, in successive portions, and boil until the gas ceases to be evolved. Collect the precipitate on a calico filter, and, having poured on distilled water until the washings cease to cause turbidity when dropped into a solution of nitrate of silver containing free nitric acid, dry the product, first on blotting-paper placed on a porous brick, and finally by a steam or water heat."

PROPERTIES.—Calamine is commonly met with in the form of a heavy flesh-coloured powder, when pure, almost entirely soluble in sulphuric acid; it is generally a very impure oxide of zinc, most if not all of the carbonic acid having been driven off by the roasting. What is sold in the shops for calamine very frequently does not contain a particle of zinc, being sulphate of baryta coloured with Armenian bole.

ADULTERATIONS.—These are very numerous, but the principal have been referred to above. The London College gives the following characteristics and tests for the purity of calamine:—"Almost entirely soluble in dilute sulphuric acid, giving off none or very few bubbles of carbonic acid. The precipitate occasioned in this solution on the addition of ammonia or potash is re-dissolved when an excess of either is added."

THERAPEUTICAL EFFECTS.—Calamine is used in powder, or in the form of ointment as a mild desiccative and astringent for the treatment of intertrigo, excoriations, and superficial ulcerations. The formula of the Dublin College affords a very pure carbonate of zinc. an excellent astringent application in the form of ointment in many affections, especially in the chronic stages of diseases of the skin attended with much discharge. The following is the only officinal preparation of calamine :—

Ceratum Calaminæ, L. *Unguentum Calaminæ*, E. ("Prepared calamine, and wax, of each, ℥viiss ; olive oil, Oj. ; mix the oil with the melted wax ; then remove them from the fire, and when first they begin to thicken, add the calamine, and stir constantly, till they cool," L. "Calamine prepared in the same way as prepared chalk, 1 part ; simple cerate, 5 parts ; mix them well together," E.) This preparation, under the name of *Turner's cerate*, is in very general use, as a desiccative and healing ointment.

ZINCI OXYDUM, D. L. E. *Oxide of Zinc ; Flowers of Zinc.*

PREPARATION.—*Dublin.*—"Take of carbonate of zinc, any convenient quantity : place it in a clay crucible furnished with a cover, and expose it to a very low red heat until a portion of the contents of the crucible, taken from its centre, ceases to effervesce on being dropped into dilute sulphuric acid." *London.*—"Sulphate of zinc, ℔j. ; sesquicarbonate of ammonia, ℥viss. ; distilled water, cong. iij. ; dissolve the sulphate of zinc, and sesquicarbonate of ammonia, separately, in Oxij. of the distilled water, and strain ; then mix. Wash what is precipitated frequently with water ; and lastly, burn it for 2 hours in a strong fire." *Edinburgh.*—"Sulphate of zinc, ℥xij. ; carbonate of ammonia, ℥vj. ; dissolve each in Oij. of water ; mix the solutions ; collect the precipitate on a cloth ; wash it thoroughly ; squeeze and dry it ; expose it for 2 hours to a red heat."

PHYSICAL PROPERTIES.—A yellowish-white, earthy powder ; inodorous and tasteless. By careful manipulation it may be obtained perfectly white by the process of the Dublin Pharmacopœia.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of zinc, and 1 of oxygen, ($Zn\ O$.) When heated it becomes yellow, but regains its whiteness as it cools ; at a white heat it is volatilized. Oxide of zinc is insoluble in water, but most acids dissolve it readily ; from its solution in any of the acids, it is precipitated by ammonia as a white gelatinous hydrate, which is redissolved by an excess of the alkali.

ADULTERATIONS.—As met with in the shops, this preparation generally contains carbonate or sulphate of zinc, sometimes also lime and iron. The tests of the Edinburgh Pharmacopœia will detect these impurities :—White ; tasteless ; entirely soluble in dilute nitric acid ; this solution is not affected by nitrate of baryta, but gives with ammonia a white precipitate entirely soluble in an excess of the test.

THERAPEUTICAL EFFECTS.—As an astringent, oxide of zinc is only employed externally in the form of powder or ointment, to slight excoriations, chapped nipples, intertrigo, superficial ulcerations, cutaneous diseases, and in ophthalmia tarsi. (See also, *Tonics.*)

DOSE AND MODE OF ADMINISTRATION.—*Unguentum Zinci oxydi*, D. *Unguentum Zinci*, L. E. ("Oxide of zinc, ℥ij. ; ointment of white wax, ℥xij ; melt the ointment with a gentle heat, and having added the oxide of zinc, mix them intimately, and stir constantly until the mixture concretes," D. "Oxide of zinc, ʒj.; lard, ʒvj.; mix," L. "Oxide of zinc, ʒj.; simple liniment, ʒvj.; mix them well together," E.) This ointment is too strong for general purposes; another objection to its use is its being apt to *cake* on the surface to which it is applied. This may be to a great extent remedied by the addition of glycerine and some drops of an essential oil when not objectionable.

ZINCI SULPHAS, D. L. E. *Sulphate of Zinc; White Vitriol.*

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin.*—"Take of zinc laminated, or in small fragments, four ounces; oil of vitriol of commerce, three fluid ounces; distilled water, one quart; nitric acid of commerce; dilute sulphuric acid, of each, a fluid drachm; prepared chalk, two drachms. Place the zinc, oil of vitriol, and a pint of the water, in a porcelain capsule, and, when gas ceases to be developed, boil for ten minutes. Pass then the solution through a calico filter, and having added to it the nitric acid, evaporate to dryness. Let the dry salt be dissolved in the remainder of the water, and let the solution, when cold, be shaken several times, for six hours, in a bottle with the chalk, and then cleared by passing it through a filter. It is now, after having been acidulated with the dilute sulphuric acid, to be evaporated till a pellicle begins to form on its surface, and then set to crystallize. The crystals thus obtained should be dried on blotting-paper without heat, and then preserved in a bottle. By further concentrating the solution from which the crystals have separated, an additional product will be obtained." *Edinburgh.*—"It may be prepared either by dissolving fragments of zinc in diluted sulphuric acid, till a neutral liquid be obtained, filtering the solution, and concentrating sufficiently for it to crystallize on cooling—or by repeatedly dissolving and crystallizing the impure sulphate of zinc of commerce, until the product, when dissolved in water, does not yield a black precipitate with tincture of galls."

PHYSICAL PROPERTIES.—This salt is met with in the shops, in small fragments of transparent colourless crystals, the primary form of which is the right rhombic prism; they are inodorous, but have a styptic, metallic taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of oxide of zinc, 1 of sulphuric acid, and 7 of water, ($ZnO, SO^3 + 7 HO$.) It effloresces in dry warm air; heated it melts in its water of crystallization, which, if the temperature be increased, is all driven off, and at an intense heat it is decomposed, the acid being expelled, and the oxide of zinc left. Sulphate of zinc is soluble in 2½ parts of temperate water, and in less than its own weight of boiling water; it is also soluble in alcohol. In the process of the Dublin College, for preparing this salt, the nitric acid is used with the view of preventing the formation of any subsulphate, of aiding in the oxydation of the zinc and of precipitating any iron that may accidentally exist in it.

ADULTERATIONS.—The only impurity of much importance met with in this salt is oxide of iron; it may be readily detected by adding ammonia to a solution of the sulphate, when a white precipitate will be produced soluble in excess of the alkali, but if any iron be present, it will not be completely re-dissolved. In France an adulteration of sulphate of zinc with sulphate of soda has been recently noticed. The following are the characteristics and tests for the purity of the salt given in the London Pharmacopœia :—Soluble in water ; ammonia throws down a white precipitate soluble in an excess of the alkali ; the precipitates with chloride of barium and acetate of lead are soluble in dilute nitric acid ; the precipitate thrown down by sesquicarbonate of ammonia from a solution of 100 grains in water, yields when exposed to a sharp heat 27·9 grains of oxide of zinc.

THERAPEUTICAL EFFECTS.—In large doses, unless discharged by vomiting, sulphate of zinc is an irritant poison. In small doses it acts as an astringent, and is beneficially employed as such, in chronic diarrhœa and dysentery, in excessive secretion from the bronchial tubes unaccompanied by inflammation, in fluor albus, and in gleet. As a topical remedy, it is very much employed in solution : as a collyrium in chronic ophthalmia, as a lotion in old ulcers attended with profuse discharge, and as an injection in the advanced stages of gonorrhœa, in gleet, and in leucorrhœa. (See, also, *Emetics* and *Tonics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. v. made into pill with conserve of roses, or with some astringent extract. For external use, gr. j. to ʒss., according to circumstances, may be dissolved in f℥j. of water.

INCOMPATIBLES.—Alkalies, and their carbonates ; lime water ; acetate of lead ; nitrate of silver ; astringent vegetable infusions or decoctions, and milk.

In poisoning with this salt, warm demulcent drinks, as infusion of linseed, decoction of barley, &c., should be administered to promote its evacuation by vomiting. If inflammatory symptoms occur subsequently, they are to be combated by the usual antiphlogistic remedies.

CHAPTER IV.

CATHARTICS.

(Purgatives—Evacuants).

THE medicines included in this class may be defined to be agents which quicken or increase alvine evacuations. Cathartics vary much in the manner in which they produce their effects. Some act merely by exciting the muscular fibres of the intestines to increased peristaltic motion, and thus cause their contents to be more quickly and more completely evacuated. Some stimulate the mucous follicles and exhalents, so that a larger quantity of fluids than usual is excreted from the inner coat of the intestinal canal, and thus the fecal evacuations are rendered more liquid and more copious. In many, both these properties are united. And some extend their stimulus to the neighbouring viscera also, and hence produce an increased discharge of the supplementary intestinal secretions, as the bile and pancreatic juice. Cathartics differ also as to the part of the intestinal canal on which they act : the effects of some being confined to the small, and of others to the large intestines ; while many of them appear to stimulate the entire tube. They differ, moreover, as to the degree in which they produce their effects, and hence have been generally divided into three classes :—*Laxatives*, which operate so mildly as merely to produce the evacuation of the intestinal contents, without causing increased secretion or stimulating any of the neighbouring viscera : *Purgatives*, properly so called, which, besides remarkably increasing the peristaltic action of the intestines, occasion increased excretion of the fluids from the exhalent vessels, and from the neighbouring viscera, and also extend their stimulant effects to the system in general : And *Drastic* or *Hydragogue* cathartics, which operate in the same manner as purgatives, but with much greater energy, and which, if given in an overdose, produce inflammation of the intestines, characterised by constant vomiting and purging, and intense pain. Although, for the sake of simplicity in classification, I have arranged the remedies belonging to these three divisions under the one head, *Cathartics ;* in prescribing them, due attention must be paid to the special characteristics of their mode of operation, so as to fulfil the indications for which they may be administered. These distinctions will be more conveniently considered, when treating of the therapeutical effects of the individual remedies of this class. Cathartics may be also divided into two classes, depending on the manner in which their effects are produced, that is to say, whether their operation is caused by a direct or local action on the mucous membrane of the digestive canal in the same manner as irritating or indigestible articles of food occasion diarrhœa ; or indirectly by their being first taken into the circulation as is known to occur with regard to rhubarb and other cathartic medicines; which purge if injected into the veins. But this division, however scientific, it is apparent, can be of but little therapeutical value. Cathartic medicines are derived from both the organic and inorganic divisions of the materia medica. The vegetable kingdom yields a very large proportion of them, the cathartic property in such being usually dependant on a resin, an oil, or some acrid principle which produces its effects either directly as a local irritant, or by being first taken into the circulation ; their action too varies, that of some being very mildly laxative, of others, decidedly purgative, while several constitute the most powerful hydragogues. The cathartics derived from the inorganic kingdom are with a single exception —sulphur—obtained from the metals; these are usually described in two classes, *mercurials* and *salines*. The former are characterised by the property which they possess of augmenting nearly all the secretions, but especially that of the liver ; and the latter by their operation depending on an increased discharge of serum, the evacuations which they produce being consequently termed watery. The prescriber should remember that the effect of Cathartics may be much augmented, or their operation modified, by their judicious combination, or by the addition of medicines possessing other properties, as for example, a stimulant or tonic; indeed I have been convinced by experience, that tonics are not ordered in combination with Cathartics as frequently as they ought to be ; they not only augment the effect of the Cathartic, thus rendering a smaller dose of the latter necessary ; but they give tone to the digestive canal, thereby removing a condition of the system on which habitual constipation is so frequently dependent. Nature has prepared several valuable and most important combinations of saline Cathartics in the form of mineral waters, which operate effectually and in much smaller doses than when the same salts are taken alone. This is a valuable hint too often overlooked by the prescriber, who will find that a judicious combination of several cathartic medicines acts with more certainty and in much smaller doses than any single drug of this class.

ALOE HEPATICA, D. L. ALOE INDICA, E. *Hepatic Aloes; Indian Aloes; Extract or inspissated juice, obtained from the leaves of one or more undetermined species of Aloë*, D.;—*Inspissated juice of an undetermined species of Aloë*, L. E.

ALOE SOCOTRINA, L. E. *Inspissated juice of an undetermined species of Aloë*, L. E.

ALOE BARBADENSIS, L. E. *Barbadoes aloës. Inspissated juice of the cut leaves of the Aloë vulgaris*, L. *Extract or inspissated juice of one or more undetermined species of Aloë*, E. The different commercial varieties of Aloes are obtained from various species of the genus Aloë; they are inhabitants of the East and West Indies, Socotra, Barbary, and the Cape of Good Hope; and belong to the Natural family *Liliaceæ*, and to the Linnæan class and order *Hexandria Monogynia*.

BOTANICAL CHARACTERS.—The species of the genus Aloë, from which the drug is obtained, are generally characterized by having woody stems, with large, fleshy, amplexicaul leaves, glaucous, flat above and convex below, having marginal spines or serratures; Flowers, numerous, in spikes or racemes, tubular, coloured; stamens exserted.

PREPARATION.—It is obtained by cutting the leaves transversely near their base, and evaporating the juice, which flows spontaneously from them, either in the sun or with the aid of heat; sometimes the flow of juice from the leaves is aided by plunging them in hot water; and sometimes by pressure, when an inferior sort of aloes is obtained; a still worse description is procured by evaporating a decoction of the leaves.

PHYSICAL PROPERTIES.—Obtained in these different ways, and from various parts of the world, aloes differs much in its physical properties, consequently several varieties of the drug are met with in commerce. In addition to the three kinds admitted by the Colleges, I shall describe a fourth, *Cape aloes*; the Dublin College apparently includes the two first varieties under the term Hepatic Aloes.—1. Socotrine aloes *(Aloë Socotrina)*, is named from its being procured in the island of Socotra, whence it is imported into England either by way of Smyrna or Bombay; it is in masses of a golden-brown colour, having a smooth, glassy fracture, and a translucent garnet-red hue at the edges; the odour is fragrant and aromatic, much heightened by being breathed on, and the taste is bitter; it yields a powder of a beautiful golden-yellow colour which is almost entirely soluble in proof-spirit. The following are the characters assigned to Socotrine aloes in the London Pharmacopœia:—"Fragile, bitter, of a reddish-brown colour, with an aromatic odour; thin laminæ are translucent when freshly broken." The Edinburgh College states that it is:—"In thin pieces, translucent and garnet-red, almost entirely soluble in spirit of the strength of sherry. Very rare." Socotrine aloes is most probably procured from the *Aloë socotrina*, it is imported in skins or in chests.—2. East Indian aloes *(Aloë Indica*, E.), is usually confounded, at least in Ireland, with the foregoing variety. It occurs in large opaque masses, of a dark liver-brown colour, with a dull, waxy, fracture; the odour is somewhat similar to, but not so agreeable as that of Socotrine aloes, and the taste equally bitter; it yields a dull reddish-yellow powder, a great part of which is insoluble in proof-spirit. It is brought to England in skins and chests from Bombay, but it is stated to be originally obtained from the coasts of the Red Sea. It is perhaps obtained from a species of aloe if not identical with, nearly allied to, the *Aloë socotrina.* It is probable that this is the variety of aloes officinal in the last edition of the London Pharmacopœia under the name of hepatic aloes; the characteristics given for it therein are as follows: "Opaque, of a liver colour, with a bitter taste and disagreeable odour."—3. Barbadoes aloes (*Aloë Barbadensis,* L. E.), is a product of Barbadoes, Jamaica, and other West India Islands, whence it is imported in gourd-shells, occasionally in boxes. It is of a dark liver-brown, sometimes almost black colour; the fracture is dull and opaque, the odour strong and disagreeable, resembling that of the human axilla, and the taste very bitter. It is reduced to powder with difficulty, the powder being of a dull dark-yellow colour. It is described in the London Pharmacopœia as being "dull and opaque, of a liver colour, with a bitter nauseous taste, and a very disagreeable odour." This variety is obtained from the *Aloë vulgaris,* and probably from some allied species.—4. Cape aloes (*Aloë Capensis*), is imported in skins and in chests from the Cape of Good Hope, and is very common in English commerce, although not introduced into any of the pharmacopœias. It is of a glossy resinous appearance, a dark brown colour, with a greenish yellow shade, especially when in small fragments, a strong disagreeable odour much increased by breathing on it, and an acrid bitter taste; it is very brittle, and readily reduced to powder, which is of a shining, greenish-yellow colour. It is procured from the Aloë spicata and several other allied species.

CHEMICAL PROPERTIES.—The most important constituent of aloes is a bitter extractive matter (*Aloesin,* Pfaff; *Aloïne,* Meisner;) amounting in the finer sorts to nearly 80, in the inferior to about 50 per cent.; it has been supposed generally to be the active principle of the drug, but Robiquet states that pure aloïne prepared by him had not the least purgative action. Aloïne was obtained in large quantity from Barbadoes aloes in 1851 by the Messrs. Smith of Edinburgh, and its employment in medicine has been proposed by these chemists. It may be readily procured from Barbadoes aloes by the following process:—The aloes previously dried is pounded with a quantity of sand to prevent its agglutinating; the mass is then macerated repeatedly with cold water, and the liquor thus obtained concentrated *in vacuo* to the consistence of a syrup. This is left at rest in a cool place for 2 or 3 days, when it deposits a mass of small granular crystals of a brownish-yellow colour. To purify these crystals—which constitute the aloïne in an impure state—they must be first dried by pressure between folds of blotting-paper and then repeatedly crystallized out of hot water until they have only a pale sulphur-yellow colour. Care must be taken that the heat of the aqueous solution should not exceed 150° F. as at 212° the aloïne is rapidly oxidized and decomposed. Aloïne is neutral, has a taste at first sweetish then intensely bitter, and is scarcely soluble in water or alcohol at ordinary temperatures but is very soluble in ether when slightly warmed. According to Dr. Stenhouse its composition is $C^{34}H^{18}O^{14}$. The finer sorts of aloes contain also resin and two peculiar acids *Aloetic* and *Aloeretinic acids*; in addition to these substances, the inferior sorts contain some vegetable albumen. Aloes is almost completely soluble in boiling water, but as the water cools a dark brown substance, insoluble in cold water, is deposited; it is very sparingly soluble in rectified spirit, but dissolves almost entirely in proof spirit, and still more readily in weaker spirit; heated, it fuses imperfectly, and if the heat be continued is converted into a resinous-looking, very friable mass.

ADULTERATIONS.—The only adulteration of aloes is, the mixing the inferior sorts with, or substituting them for, the finer kinds; of this we can judge by the physical characters, particularly the odour when breathed on, or by the solubility in weak spirit.

THERAPEUTICAL EFFECTS.—In moderate doses, from three to ten grains, aloes acts as a stimulating cathartic, influencing especially the large intestines, on which it operates rather by exciting their peristaltic action, than causing increased secretion from their mucous membrane. It produces its effects more slowly than most other medicines of this class, from ten to eighteen hours usually elapsing before it operates. The specific action of aloes on the large intestines contraindicates its employment in hemorrhoidal affections, in irritation or inflammation of the pelvic viscera, the prostate gland or the urethra, in pregnancy or during the menstrual discharge. From its mode of operation it is also evidently not adapted for cases in which we wish to produce increased secretion from the intestinal canal, or where a speedy operation is required. The employment of aloes as a purgative, is, nevertheless, very general, and perhaps there are few vegetable cathartics more extensively used, as may be judged from the numerous officinal formulæ for its administration which are contained in the British Pharmacopœias. In torpor of the intestines, especially when accompanied by deficient secretion of bile, it is the most useful of this class of remedies; indeed it appears to be the best substitute for that secretion, and is therefore exhibited with the most beneficial results in jaundice when unaccompanied by hepatic inflammation, mechanical obstruction of the ducts, &c. In habitual costiveness so common in females, aloes is also administered with much benefit, due attention being paid to the circumstances which contraindicate its employment. Christison states, that the cathartic property of aloes is much increased by its combination with sulphate of iron, and that its irritating action on the rectum is counteracted by combining it with the extract of hyoscyamus; both of which statements my experience fully confirms.

DOSE AND MODE OF ADMINISTRATION.—*Aloë hepatica*, D. L. *Aloë socotrina*, L. E. *Aloë indica*, E. gr. iij. to gr. xv.—*Aloë barbadensis*, L. E. gr. ij. to gr. v. It is best administered in the form of pill, made with honey, mucilage, &c. The dose of *Aloïne* is from gr. ss. to gr. ij. according to the Messrs. Smith in one instance in which four grains were given a very violent action on the bowels was caused.

Extractum Aloes aquosum, D. *Extractum Aloes*, L. (" Take of hepatic aloes, in coarse powder, four ounces; water, two pints. Boil the aloes until it is dissolved; when the solution is cold and the dregs have subsided, pour off the clear liquid, and evaporate it to a proper consistence," D. " Socotrine aloes, powdered, ℥xv.; boiling distilled water, cong. j.; macerate for three days with a gentle heat; strain, allow the feces to subside; pour off the clear liquor, and evaporate to a proper consistence," L.) *Extractum Aloes Barbadensis*, L. (Prepared in the same way as Extract of Aloes.) Dose, gr. v. to gr. xv. These are useless preparations when we can obtain good aloes.

Pulvis Aloes compositus, L. (Socotrine or hepatic aloes, ℥iss.; guaiacum resin, ℥j.; compound cinnamon powder, ℥ss.; rub the aloes and guaiacum separately to powder, and mix in the cinnamon powder.) A stimulating cathartic not much used. Dose, gr. x. to ℈j.

Pilulæ Aloes, E. (Socotrine aloes; and Castile soap, of each, equal parts; conserve of red roses, a sufficiency; beat into a proper pill mass. This pill may also be correctly made with the finer qualities of East Indian aloes, as the Socotrine variety is very scarce; and many prefer, not without reason, the stronger Barbadoes aloes.) *Pilula Aloes cum Sapone*, L. (Extract of Barbadoes aloes, powdered; soft soap; extract of liquorice, of each, equal parts; treacle, a sufficiency; pound the extract of aloes with the soap, then add the other ingredients and beat all together into a mass.) An excellent formula, the soap aiding the action of the aloes and rendering its operation more certain. Dose, gr. v. to gr. xv.

Pilula Aloes composita, D. L. (" Take of hepatic aloes, in powder, two ounces; extract of gentian, one ounce; oil of caraway, one fluid drachm; treacle, *by weight*, one ounce. Beat them together until they are thoroughly incorporated," D. " Socotrine aloes, powdered, ℥j.; extract of gentian, ℥ss.; oil of caraway, min. xl.; treacle, a sufficiency; beat them together until they are thoroughly incorporated into a mass fit for making pills," L.). An excellent habitual purgative. Dose, gr. v. to gr. xv.

Pilula Aloes cum Myrrhâ, D. L. E. (" Take of hepatic aloes, in powder, two ounces; myrrh, in powder, one ounce; dried saffron, in powder, half an ounce; treacle, *by weight*, two ounces and a half. Triturate the aloes, myrrh, and saffron together, and sift them; then add the treacle, and beat all the ingredients into a uniform mass," D. " Socotrine or hepatic aloes, powdered, ℥ss.; saffron; myrrh, powdered; soft soap, of each, ʒij.; treacle, a sufficiency; beat together into a mass," L. " Socotrine or East Indian aloes, 4 parts; saffron, 1 part; myrrh, 2 parts; conserve of red roses, a sufficiency; beat to a proper mass," E.) *Rufus' Pills*. An excellent stimulating cathartic and emmenagogue. Dose, gr. x. to gr. xx.

Pilulæ Aloes et Assafœtidæ, E. (Socotrine or East Indian aloes;

assafœtida; and Castile soap, equal parts; conserve of red roses, a sufficiency; beat to a proper mass.) Cathartic and antispasmodic. Dose, gr. x. to gr. xv.

Pilulæ Aloes et Ferri, E. (Sulphate of iron, 3 parts; Barbadoes aloes, 2 parts; aromatic powder, 6 parts; conserve of red roses, 8 parts; pulverise the aloes and sulphate of iron separately, and beat into a proper mass, which is to be divided into five grain pills.) Tonic and cathartic, well adapted for chlorosis. Dose, one to three daily.

Pilulæ ante cibum, Paris Codex. (Aloes, 6 parts; extract of cinchona, 3 parts; canella, 1 part; syrup of wormwood, a sufficiency; divide into four grain pills.) One or two before dinner.

Decoctum Aloes compositum, D. L. *Decoctum Aloes*, E. ("Take of hepatic aloes, in powder, one drachm and a-half; myrrh, in powder; saffron, chopped fine, of each, one drachm; pure carbonate of potash, two scruples; extract of liquorice, half an ounce; water, fourteen ounces; compound tincture of cardamoms, as much as is sufficient. Rub the aloes, myrrh, and carbonate of potash together, then add the saffron and extract of liquorice, and boil for ten minutes, in a covered vessel; cool, strain through flannel, and add of compound tincture of cardamoms as much as will make sixteen fluid ounces," D. "Extract of liquorice, ʒvij.; carbonate of potash, ʒj.; extract of aloes; myrrh, powdered; saffron, of each, ʒiss.; distilled water, Oiss.; compound tincture of cardamoms, f℥viiss.: boil together the liquorice, carbonate, aloes, myrrh, and saffron in the water down to a pint and strain; then add the tincture," L. "Extract of liquorice, ℥ss.; carbonate of potash, ℈ij.; Socotrine or hepatic aloes, bruised; myrrh, bruised; and saffron, of each, ʒj.; water f℥xvj.; boil together down to f℥xij.; filter, and add of the compound tincture of cardamoms, f℥iv." E.) A mild cathartic with tonic properties: acids, acidulous and most metallic salts are incompatible in prescription with it. Dose, f℥ss. to f℥ij.

Vinum Aloes, L. E. ("Socotrine or hepatic aloes, rubbed to powder, ℥ij.; canella bark, powdered, ʒiv.; sherry wine, Oij; macerate for seven days and strain," L. "Socotrine or East Indian aloes, ℥iss.; cardamom seeds, ground; and ginger in coarse powder, of each, ʒiss.; sherry, Oij.; digest for seven days, and strain through linen or calico," E.). A warm purgative. Dose, f℥ss. to f℥j.

Tinctura Aloes, L. E. ("Socotrine or hepatic aloes, in coarse powder, ℥j.; extract of liquorice, ℥iij.; distilled water, Oiss.; rectified spirit, Oss.; macerate the aloes in the spirit mixed with the water, for seven days; then add the extract, and as soon as it is dissolved, strain," L. "Socotrine or East Indian aloes, in coarse powder, ℥j.; extract of liquorice, ℥iij.; rectified spirit, f℥xij.; water, Oj. and f℥viij.; mix and digest for seven days with occasional agitation; filter the clear liquor separated from the sediment. This tincture cannot without difficulty and delay be prepared by percolation," E.). Cathartic and tonic. Dose, min. xxx. to f℥ss.

Tinctura Aloes composita, L. *Tinctura Aloes et Myrrhæ*, E. ("Socotrine or hepatic aloes, coarsely powdered, ℥iv.; saffron, ℥ij.; tincture of myrrh, Oij.; macerate for seven days and strain," L. "Socotrine or East Indian aloes, in coarse powder, ℥iv.; tincture of myrrh, Oij.; saffron, ℥ij.; macerate for seven days and filter. This tincture cannot well be prepared by percolation," E.). Stomachic and cathartic. Dose, fʒss. to fʒij.

Enema Aloes, L. (Aloes, ℈ij.; carbonate of potash, gr. xv.; decoction of barley, Oss.; mix and rub them together.) A useful stimulating cathartic in the constipation of amenorrhœa; also employed for dislodging ascarides from the rectum.

CALOMELAS, D. E. *vel* CALOMELAS SUBLIMATUM, D. HYDRARGYRI CHLORIDUM, L. *Calomel; Sublimed Calomel; Chloride of Mercury. Subchloride of Mercury*, Graham.

PREPARATION.—CALOMELAS SUBLIMATUM, D. "Take of sulphate of mercury, ten pounds; mercury of commerce, seven pounds; dried chloride of sodium, five pounds. Incorporate as completely as possible the sulphate and the metallic mercury by prolonged trituration, and having then added the chloride of sodium previously reduced to a fine powder, rub all well together until a perfectly equable mixture is obtained. Heat this, through the medium of sand, in a shallow iron pot with a flat bottom, lined with clay, and covered with a lid of cast iron, until the sublimate which attaches itself to a circular plug in the centre of the lid (which admits of being removed and cleaned from time to time,) neither exhibits minute globules of mercury, nor is rendered yellow by being touched with a solution of caustic potash. The whole being now permitted to cool down to the temperature of the air, the contents of the pot are to be transferred to a small hot-hearth or oven, whose door is made tight by a clay lute, and a regulated heat is to be applied so as to cause the vaporised calomel to pass into an adjacent chamber of considerable size, on the floor of which it will accumulate in the form of a fine white powder."—HYDRARGYRI CHLORIDUM, L. "Mercury, ℔iv.; sulphuric acid, f℥xxiss.; chloride of sodium, ℔iss.; distilled water, a sufficiency. Boil ℔ij. of the mercury with the sulphuric acid in a proper vessel, until a bipersulphate of mercury remains dry; rub this when it is cold with ℔ij. of mercury in an earthen mortar, that they may be perfectly mixed. Afterwards add the chloride of sodium, and rub them together until globules are no longer visible; then sublime. Rub the sublimate to very fine powder, and wash it carefully with boiling distilled water, and dry it."—CALOMELAS, E. "Mercury, ℥viij.; sulphuric acid, f℥ij. fʒiij.; nitric acid, f℥ss.; muriate of soda, ℥iij.; mix the acids, add to them ℥iv. of the mercury, and dissolve it with the aid of a moderate heat; raise the heat so to obtain a dry salt. Triturate this with the muriate of soda and the rest of the mercury, till the globules entirely disappear; heat the mixture by means of a sand-bath in a proper subliming apparatus. Reduce the sublimate to fine powder; wash the powder with boiling distilled water until the water ceases to precipitate with solution of hydriodate of potash; and then dry it."

PHYSICAL PROPERTIES.—Calomel as obtained by sublimation is sometimes in the form of a semitransparent, white, crystalline cake, the crystals being four-sided prisms; as usually met with, however, it is a heavy, snow-white, soft powder, inodorous and tasteless. Its specific gravity is 7·14 (Boullay).

CHEMICAL PROPERTIES.—Calomel is a subchloride of mercury, being composed of one equivalent of chlorine, and two of mercury ($Hg^2 Cl$) It is completely insoluble in cold or boiling distilled water, in alcohol, or in ether. It acquires a yellow tinge in the air, or by rubbing; exposed to heat it becomes yellow, and volatilizes at a heat below redness, if under pressure it fuses; with lime water it gives a blackish precipitate, *sub-oxide* of mercury.

ADULTERATIONS.—Calomel sometimes contains corrosive sublimate, which may be detected by agitating with sulphuric ether, pouring off the clear liquid and evaporating; if any sublimate be present, a crystalline powder is left, which becomes yellow with solution of caustic potash; this adulteration I have repeatedly detected in calomel, my attention having been in some instances first directed to it by the irritation which it produced when administered to patients; a patient to whom calomel thus adulterated was given in the form of powder, complained of a burning sensation in the back of the mouth and pharynx. The presence of any fixed white powder may be detected by applying a sufficient heat to sublime the calomel. The London College proposes the following additional tests for its purity:—Nitrate of silver, lime water or hydro-sulphuric acid, added to water with which it has been washed or boiled, causes no precipitate."

THERAPEUTICAL EFFECTS.—Calomel is seldom employed alone as a cathartic, but combined with other remedies of this class it is very frequently used, chiefly in consequence of its action on the secreting organs, stimulating the liver and intestinal glands to increased activity. It is therefore peculiarly adapted for all diseases attended with functional derangement of the hepatic system; as well as for those cases in which there is determination of blood to the vessels of the brain, as in some forms of chronic head-ache, in threatened apoplexy, and paralysis, &c. It is also used with much benefit as a purgative in the early stages of inflammatory diseases and of fevers, more especially in the fevers of warm climates, in which it is generally given in very large doses, from 15 to 30 grains, its cathartic action not being increased in proportion to the dose. In doses of from fifty to a hundred grains it is said to act as a powerful diuretic, and it has been thus employed in America. So large a dose, if given at all, should not be repeated more than once daily nor for a longer period than three days. Calomel is well suited as a purgative for children, being tasteless, and in general producing copious alvine evacuations without pain; here also its combination with other purgatives, as jalap or scammony, will be attended with benefit. In verminous diseases it is the best purgative that can be employed, as it not only dislodges the worms from the intestines, but also acts as a poison to them. (See, also, *Special Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—In powder or pill, from gr. ij. to gr. vj.

Pilulæ Catharticæ compositæ. United States Pharmacopœia. (Calomel, ʒiij.; compound extract of colocynth, in powder, ℥ss.; extract of jalap, ʒiij.; gamboge in powder, gr. xl.; form them into a mass with water and divide into 180 pills.) An excellent purgative, combining efficiency of action and comparative mildness with smallness of bulk. Each pill contains one grain of calomel; Dose, one or two pills.

INCOMPATIBLES.—The alkalies, and their carbonates; chloride of sodium; lime water; nitric and muriatic acids; iodide of potassium; sulphuretted hydrogen, and its combinations; soaps, &c.

CAMBOGIA (SIAMENSIS), E. CAMBOGIA, L. *Siam gamboge.—Gum-resin of an uncertain species of Garcinia,* L. *From an unascertained plant inhabiting Siam, probably a species of Hebradendron,* E.

CAMBOGIA, D. CAMBOGIA (ZEYLANICA), E. *Ceylon gamboge; Gum-resinous exudation of Hebradendron gambogioides.* The plant which yields commercial or Siam gamboge is not yet ascertained; it is conjectured by the Edinburgh College, to be a species of Hebradendron nearly allied to the Hebradendron gambogioides, from which plant Ceylon gamboge is procured; but more recent investigations tend to prove that it is the produce of a species of Garcinia as yet unascertained, so that the reference in the last edition of the London Pharmacopœia is correct. The gamboge of medicine is erroneously ascribed by the Dublin College to the Ceylon gamboge tree; it belongs to the Natural family *Guttiferæ* (*Clusiaceæ,* Lindley), and to the Linnæan class and order *Monœcia Monadelphia.*

BOTANICAL CHARACTERS.—A handsome tree of moderate size, with opposite, stalked, leaves; unisexual flowers, sessile and axillary; and a pleasant saccharine fruit, about the size of a cherry, four celled, each cell one seeded.

PREPARATION.—In Ceylon, gamboge is procured by making incisions into the bark of the tree, or removing a piece of it, when a viscid, bright-yellow juice exudes, which, when dried by exposure to the sun in shallow bowls, concretes into a hardened mass. In Siam it is said to be obtained by breaking across the young branches and leaves, and collecting the juice that drops from them: be this as it may, the finer qualities are allowed to dry in the hollow stems of the bamboo-cane, or probably the juice is collected in them; and of late it has been commonly imported in the reeds.

PHYSICAL PROPERTIES.—Commercial or Siam gamboge is generally met with in two forms; that of cylinders, sometimes hollow, more frequently solid,—*Pipe Gamboge;* and in irregular shaped masses,—*Cake or Lump Gamboge.* Pipe gamboge is of a rich, reddish yellow colour, generally greenish and dusty externally; inodorous, tasteless at first, but soon causing a sense of acridity in the throat; brittle, with a smooth, glistening, conchoidal fracture. Lump gamboge is of a duller colour, its fracture is splintery with scarcely any lustre, and it contains small fragments of wood and many air-vesicles. *Ceylon Gamboge* (for a specimen of which I am indebted to my friend, Professor Christison) is not an article of English commerce; it is a coarse looking substance with numerous air-vesicles, of a dull reddish-yellow colour with many dark-brown spots. It would appear to have nearly similar purgative properties to Siam gamboge, but it is much inferior as a pigment, and as this is the chief, almost the only use to which the gum-resin is put, some gamboge imported from Ceylon was found to be quite unsaleable, and of late years it has not occurred in commerce.

CHEMICAL PROPERTIES.—Gamboge is composed of resin *(Gambogic acid)*, soluble gum, and a trace of woody fibre; the proportion of the resin, which is the active principle, varies, according to several of Christison's analyses, from 68 to 75 per cent. Gamboge, although not soluble in water, forms a perfect emulsion with it; it is almost entirely soluble in rectified spirit, and sulphuric ether completely dissolves out the resin, leaving the gum.

ADULTERATIONS.—The inferior varieties of gamboge are adulterated with some amylaceous matter, they also generally contain lignin; the former is detected by a cooled decoction becoming greenish on the addition of tincture of iodine, and the presence of the latter may be known by the fracture not being smooth and conchoidal.

THERAPEUTICAL EFFECTS.—Gamboge is a drastic cathartic, producing even in small doses frequent and copious watery evacuations, attended with much irritation of the stomach and bowels; in somewhat larger doses it occasions vomiting and even sometimes inflammation of the intestinal canal, followed by death; a single drachm has proved a fatal dose in more than one instance, the post-mortem appearances being ulceration and mortification of the intestines. In consequence of the distress caused by even medicinal doses of gamboge, it is seldom employed alone as a purgative, but is frequently added to other remedies of this class, either to augment their power, or to produce increased secretion from the alimentary canal. It is chiefly used as a cathartic in dropsical affections, for which it is well adapted, as it not only causes a large discharge of serum from the intestines, but stimulates the kidneys to increased action. The combination of gamboge with an alkali, as with carbonate of potash, acts as a diuretic of much power, and such a preparation under the name of *tincture of gamboge* is highly praised by many continental writers. The resin of gamboge in somewhat smaller doses has a precisely similar action to the drug itself.

DOSE AND MODE OF ADMINISTRATION.—In powder, pill, or emulsion, gr. ij. to gr. v. which may be repeated every five or six hours until it operates; it should be always finely powdered and combined with some comparatively inert substance, as sugar, sulphate of potash, or cream of tartar.

Pilula Cambogiæ composita, L. (Gamboge, powdered, ʒij.; Socotrine or hepatic aloes, powdered, ʒj.; ginger, powdered, ʒj.; soft soap, ℥ss.; mix the powders together, add the soap, and beat them into a mass.) A useful cathartic combination, operating effectually in doses of from gr. x. to gr. xx.

Pilulæ Cambogiæ, E. (Gamboge; East Indian or Barbadoes aloes; and aromatic powder, of each, one part; Castile soap, two parts; pulverize the aloes and gamboge separately, mix all the powders, add the soap, and with the aid of syrup beat into a proper pill mass.) Properties and dose same as last.

Tinctura Gambogiæ, VOIGTEL. (Gamboge, powdered, ℥ss. ; carbonate of potash, ℥j. ; brandy, f℥xij. ; mix the powders intimately, add the spirit and digest for four days with a gentle heat.) An excellent diuretic. Dose, fʒss. to fʒj.

In cases of poisoning with gamboge, emollient and demulcent drinks should be given, and similar enemata administered ; to be followed by small but repeated doses of opium, and the use of the warm-bath.

CASSIÆ PULPA, E. CASSIA, L. *Cassia pulp. Pulp of the pods of Cassia fistula. The fruit of Cassia fistula*, L. This tree, originally a native of Africa, is now generally diffused over the East and West Indies, and grows abundantly near Alexandria, the quantity of the fruit annually exposed for sale in the markets of that town, amounting to 50,000 pounds weight. It belongs to the Natural family *Leguminosæ (Fabaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A handsome tree, about thirty feet in height; with alternate, pinnate leaves ; bright yellow papilionaceous flowers in racemes ; and cylindrical legumes or pods, about one or two feet long, of a blackish-brown colour.

PREPARATION.—The pulp of the pods is the part employed in medicine. It is usually prepared by pouring water on the bruised pods, so as to wash out the pulp, pressing through a sieve, and evaporating the solution thus obtained to the consistence of a thick extract. In the last edition of the London Pharmacopœia, the commercial pulp is directed to be further prepared for use in medicine as follows :—*Cassia præparata*, "Cassia, broken lengthwise, ℔j. ; distilled water, sufficient to cover it ; macerate for six hours, frequently stirring ; strain the washed pulp through a hair-sieve, and evaporate in a water-bath to the consistence of a confection."

PROPERTIES.—Cassia pulp is of a reddish-black colour, and has a sweetish mucilaginous taste, but no odour. It consists of sugar, gum, mucilaginous extractive, and colouring matter; no principle possessing purgative properties has as yet been discovered in it. It is almost entirely soluble in both alcohol and water.

ADULTERATIONS.—The pulp is not liable to adulteration ; those pods only should be chosen which are heavy, and in which the seeds do not rattle.

THERAPEUTICAL EFFECTS.—Cassia pulp is a mild laxative, at present but seldom employed ; it is only adapted for febrile or inflammatory affections occurring in persons of delicate habit or in children. Combined with manna, its cathartic properties are said to be much increased.

DOSE AND MODE OF ADMINISTRATION.—Of the pulp, ℥ss. to ℥iij.

Confectio Cassiæ, L. (Cassia pulp, prepared, ℔ss. ; manna, ℥ij.; tamarind pulp, prepared, ℥j. ; syrup of roses, f℥viij. ; bruise the manna and dissolve it in the syrup, then add the pulps and evaporate to a proper consistence.) Dose, ʒij. to ℥j.

COLCHICI CORMUS ET SEMEN, L. COLCHICI CORMUS ET SEMINA, E. COLCHICUM AUTUMNALE, D. *The cormus and seeds of Colchicum autumnale*, D. E. *The fresh and dried cormus and the seed of the uncultivated Colchicum autumnale*, L. *Meadow-saffron*. A common indigenous plant, belonging to the Natural family *Melanthaceæ*, and to the Linnæan class and order *Hexandria Trigynia*.

BOTANICAL CHARACTERS.—Cormus (improperly called bulb), fleshy, covered with a loose, brown, membrane; giving origin in the middle of summer to a young cormus, which remains attached to the parent, grows rapidly, and sends up in autumn a naked white tube or flowering stem, teminating in a pale purple, crocus-like flower; the flower soon dies; and the seed vessel which remains under ground, springs up with the erect, broadly lanceolate leaves, in the ensuing February or March.

PREPARATION.—The cormus should be gathered about the end of July or beginning of August, before the flowering stem is sent up. For medical purposes, it is cut transversely into thin slices, the dry coats having been previously removed; the slices are dried in a dark place, exposed to the air, with a heat not exceeding 170°. Mr. Houlton states that the colchicum cormus, when dried entire, retains its active properties much more perfectly, and for a much longer period than if it is sliced. He also recommends it to be dried without artificial heat, which he says may be readily done by stripping off the loose dry coats, and carefully removing the bud or bulb. The seeds are gathered when ripe. The following are the directions contained in the London Pharmacopœia, with reference to its collection and preparation:—"It should be dug up in July before the autumnal bud is developed, and should be dried as follows: the dry envelopes having been removed, it is to be cut transversely into thin laminæ and dried at first with a gentle heat, gradually increased to 150° F."

PHYSICAL PROPERTIES.—Colchicum cormus is ovoid, about the size of a large walnut, compressed on one side, convex on the other; it may be distinguished from bulbous roots by being solid, and not composed of laminæ or scales. The dry slices are of a grayish-white colour, and firm. The seeds are small, rough, nearly round, and of a blackish-brown colour. Both seeds and cormus are odourless, but have a bitter, acrid taste. The flowers have been occasionally employed, both in their fresh and dried state, but they are not so certain in their effects as either the seeds or cormus.

CHEMICAL PROPERTIES.—The cormus consists of fatty matter, a volatile acid, a peculiar uncrystallizable alkaloid named *veratria* (which will be described under the head of General Stimulants) combined with gallic acid, starch, gum, inulin, and lignin (Pelletier and Caventou). A crystallizable alkaloid, *Colchicia*, was discovered in the seeds by M. M. Hess and Geiger; it bears much resemblance to *veratria* with which it was at first supposed to be analogous; it is bitter, very poisonous, but neither acrid nor sternutatory, and soluble in water, alcohol, and ether. In a very able essay on colchicum, published by Dr. J. M. Maclagan in the Edinburgh Monthly Journal of Medical Science (vol. xiii. p. 501), the writer states that he has failed in verifying the observations of the last named chemists, as to the crystallizable nature of colchicia, the bitter matter which he obtained by their process being invariably deposited in the form of a brown resinous-looking mass. That the colchicia of Hess and Geiger is uncrystallizable has been also proved by the more recent investigations of M. Oberlin, which have moreover shown it to be a compound substance, and from which this chemist has obtained a neutral crystalline principle, with very active poisonous properties; this he has named *Colchicerine.* The active principles of both cormus and seed are extracted by water, alcohol, vinegar, and wine.

ADULTERATIONS.—From having been gathered at an improper season, or from careless drying or preservation, colchicum cormus is very often nearly inert. The intensity of the bitterness is the best test of the goodness of either the herb or the seeds. If an accurate result be required, it can be obtained only by ascertaining analytically the quantity of the alkaloid contained in a given specimen.

THERAPEUTICAL EFFECTS.—The most constant effect, indeed, in general, the only manifest one, of colchicum is purging; its cathartic operation being accompanied by great depression of the circulation and much debility. In large or frequently repeated doses it produces nausea, vomiting, hypercatharsis, excessive prostration, and a burning pain along the œsophagus and in the abdomen, together with insufferable thirst. In small doses it is held by many to be diuretic, but this effect is uncertain; at least, diuresis is rarely produced except by the acetous preparations of the drug, nevertheless its supposed action on the urinary secretion has induced some writers to recommend its employment in dropsy, especially in that form attended with albuminous urine. Under its use, the quantity of uric acid in the urine is very much augmented. The principal diseases in which colchicum has been employed are gout and rheumatism; for the former of which it has acquired the character of being a specific. Administered during a paroxysm of gout, it seldom fails to alleviate the pain and cut short the fit, yet its beneficial effect is more decidedly manifested if it be not administered until the violence of the fit is over; but so far from preventing a return of the attack, most practitioners agree that the employment of colchicum renders the system more predisposed to the disease, indeed, frequently gives rise to irregular or atonic gout. In rheumatic fever, the employment of colchicum requires the greatest caution, and is very seldom admissible; but in some of the chronic forms of rheumatism, especially when occurring in gouty habits, it is often used in robust constitutions with benefit. Owing to its effects on the secretion of uric acid, it is employed with the best possible results in those diseases of the urinary organs in which oxalate of lime is present in the urine; also in some forms of prurigo, of urticaria and of lichen. Colchicum has been also given as an antiphlogistic in febrile and inflammatory diseases; but in the present day its use is almost entirely confined to cases of gout and rheumatism.

DOSE AND MODE OF ADMINISTRATION.—In the administration of colchicum or any of its preparations, we should always begin with small doses and increase them very gradually, as no medicine varies more in its action on different persons, and besides the pharmaceutical preparations differ much in activity. It is rarely employed in the form of powder; the dose is from gr. ij. to gr. viij.; the powder of the seeds should be preferred to that of the cormus, as being more uniform.

Acetum Colchici, D. L. E. ("Take of colchicum bulbs, dried and bruised, one ounce ; acetic acid of commerce (sp. gr. 1044), four fluid ounces; distilled water, twelve ounces: in the acid, diluted with the water, macerate the colchicum, in a close vessel, for seven days ; then strain with expression, and filter," D. "Colchicum cormus, dried, ʒiiiss. ; dilute acetic acid, Oj. ; proof spirit, fʒiss. ; macerate the colchicum with the acid for three days in a covered vessel; press, strain, and set aside that the dregs may subside ; add the spirit to the filtered liquor," L. "Fresh colchicum bulb, sliced, ℥j. ; distilled vinegar, fʒxvj. ; proof spirit, f℥j. ; macerate the colchicum in the vinegar for 3 days in a covered glass vessel, strain and express strongly ; filter the liquors and add the spirit," E.). This preparation is preferred by Scudamore to any other for gout, he recommends magnesia to be combined with it, to saturate the acid. It is, however, of very uncertain strength, in consequence of its being frequently prepared with the dried bulb ; and for this reason the formula of the last editions of the Dublin and London Pharmacopœias is a bad one. Dose, fʒss. to fʒij., frequently repeated.

Extractum Colchici, L. (Fresh colchicum cormus, ℔j. : remove the outer coat, bruise in a stone mortar, press out the juice and evaporate it unstrained, to a proper consistence.) Dose, gr. j. every three or four hours ; not much used.

Extractum Colchici aceticum, D. L. E. ("Take of colchicum root, dried, four ounces ; dilute acetic acid, eight fluid ounces : Digest the root in the acid for fourteen days, then filter, and evaporate by means of a water-bath, to the consistence of a soft extract," D. "Fresh colchicum cormus, ℔j. ; acetic acid, f℥iij. ; bruise the cormus deprived of its outer coat, gradually adding the acid, express the juice, and evaporate it unstrained to a due consistence," L. "Colchicum bulb, ℔j. ; pyroligneous acid, f℥iij. ; beat the colchicum to a pulp, gradually adding the acid ; express the liquor, and evaporate it in a porcelain vessel not glazed with lead, over the vapour bath, to a due consistence," E.). Dose, gr. j. to gr. iij., two or three times a day. Made into pill with an equal quantity of extract of colocynth, it forms an excellent cathartic in gouty and rheumatic affections. In this preparation also the Dublin College has directed the dry cormus to be employed, and therefore it cannot be depended on. The extract prepared according to the directions of the London Pharmacopœia is so spongy as to be almost unfit for use, in consequence of its containing a large quantity of starch, from the liquid not being strained before evaporation.

Tinctura seminum Colchici, D. *Tinctura Colchici*, L. E. ("Colchicum seeds, bruised, ℥v. ; proof spirit, Oij. ; macerate for 14 days, strain, express and filter," D. "Colchicum seeds, bruised, ℥v. ; proof spirit, Oij. ; macerate for 7 days, express and filter," L. "Colchicum seeds, ground finely in a coffee-mill, ℥v. ; proof spirit, Oij. ; this tincture to be prepared like the tincture of cinchona, and percolation is much more convenient and speedy than digestion." E.). Dose, fʒj., gradually increased to fʒij., twice daily.

Tinctura Colchici composita, L. (Colchicum seeds, bruised, ℥v.; aromatic spirit of ammonia, Oij.; macerate for 7 days, express and filter.) Dose, min. xx. to min. xxx. three times a day; seldom used.

Vinum Colchici, L. E. ("Colchicum cormus, dried, ℥viij.; sherry wine, Oij.; digest for 7 days, and filter," L. "Colchicum dried and sliced, ℥viij.; sherry, Oij.; digest for 7 days, express strongly the residuum, and filter the liquors," E.). It may be prepared with the seeds (*Vinum seminum Colchici*), using the same proportions, a preferable preparation as being more uniform. Dose, fʒss., gradually increased to fʒij., three or four times a day.

Succus Colchici is prepared by expressing the juice from fresh cormi, allowing it to stand 48 hours to deposit the fecula, and adding to the clear liquor a fifth part of rectified spirit. This is a most active preparation, and keeps well. Dose, min. v. to min. xx.

INCOMPATIBLES.—Acids; tincture of iodine; tincture of guaiacum; and all astringent vegetable infusions and decoctions.

In cases of poisoning with colchicum, emetics followed by demulcent drinks should be immediately administered; and if coma be present, brandy, ammonia, coffee and other powerful stimulants given. The vegetable astringents have been recommended as antidotes, tannic acid forming an insoluble precipitate with veratria.

COLOCYNTHIS, D. L. E. *Colocynth. Pulp of the fruit of Cucumis colocynthis*, D. E. *Peeled fruit of Citrullus colocynthis* (Schrad.), L. This plant, the bitter cucumber, is a native of several parts of Asia and Africa, and is cultivated in Greece and Spain; it belongs to the Natural family *Cucurbitaceæ*, and to the Linnean class and order *Monœcia Syngenesia.*

BOTANICAL CHARACTERS.—A creeping, procumbent, annual; Leaves ovato-cordate; Flowers, yellow, axillary, solitary; Fruit *(pepo)*, globose, about the size of an orange, yellow when ripe, with a thin solid rind, fleshy, many-seeded.

PREPARATION.—The fruit is gathered when ripe, peeled and dried. In some countries it is dried without being peeled.

PHYSICAL PROPERTIES.—The pulp of the dried fruit, which is the officinal part, is of a pale yellowish-white colour; it is without odour, but has an intensely bitter, nauseous taste; is light, spongy, porous, and so tough as to be with difficulty reduced to powder. The unpeeled fruit *(Mogadore Colocynth)*, is imported in small quantities into England, but is only used by druggists for show-bottles.

CHEMICAL PROPERTIES.—Colocynth pulp contains a peculiar bitter principle, which has been named *Colocynthin*, and on which its purgative property is supposed to depend, resin, pectin, gummy matter, and various salts. It yields its active properties to both water and alcohol. According to Meissner's analysis, colocynthin constitutes about 14½ per cent. of the pulp ; it is prepared by digesting the watery extract in spirit, evaporating, and treating the resinoid mass thus obtained with a little water, when the impure colocynthin is left. It is a yellowish-brown, translucent, friable, amorphous mass, soluble in 5 parts of cold water and in alcohol and ether, the solutions are intensely bitter.

ADULTERATIONS.—Colocynth pulp is not liable to adulteration ; but when of a greyish or brownish colour, it is of inferior quality.

THERAPEUTICAL EFFECTS.—Colocynth operates as a stimulant to the intestinal canal, its influence being specially directed to the large intestines, promoting their secretions as well as increasing their vermicular motion ; in large doses it is a dangerous poison, producing intestinal inflammation. In consequence of the drastic properties it possesses when administered alone, it is always combined with other cathartics in order to mitigate its action, as in the several pharmacopœial preparations, and is thus exhibited with much advantage in habitual constipation, in passive dropsies, in alvine obstruction, and as a revulsant in determination of blood to the brain. In short, the officinal preparations of this drug are perhaps the most generally employed purgatives of the materia medica. Colocynth is also said to possess diuretic properties.

DOSE AND MODE OF ADMINISTRATION.—In powder (now seldom used), gr. ij. to gr. viij. mixed with some inert powder. Powdered colocynth if sprinkled over a blistered surface acts as a cathartic nearly as actively as if administered by the mouth, and it may be used with advantage in this way in apoplexy and other diseases in which the patient is unable or unwilling to swallow. Its use must not, however, be pushed too far, as if it does not purge, it is apt to cause inflammation of the intestines.

Extractum Colocynthidis, L. E. (" Colocynth pulp, cut, ℔iij. ; distilled water, cong. ss. ; macerate the colocynth in the water for 36 hours, frequently bruising it with the hand ; express the liquor strongly and strain it ; finally evaporate to a proper consistence," L. " Colocynth, ℔j. ; water, cong. ij. ; boil for six hours gently, replacing the water occasionally, strain while hot, and evaporate in the vapour-bath to a proper consistence," E.) A bad preparation as it does not keep well ; but seldom used. Dose, gr. v. to gr. xv. It is employed in the London Pharmacopœia for preparing the compound colocynth pill.

Pilulæ Colocynthidis, E. (Socotrine or Indian aloes ; and scammony, of each, 8 parts ; colocynth, 4 parts ; sulphate of potash ; and oil of cloves, of each, 1 part ; rectified spirit, a sufficiency ; pulverise the aloes, scammony, and sulphate together, mix the colocynth in fine powder, add the oil, and with the aid of a little spirit, beat into a proper pill mass.)—*Pilulæ Colocynthidis compositæ*, D. L. (" Take of pulp of colocynth, in fine powder, one ounce ; hepatic aloes, in fine powder, two ounces ; scammony, in fine powder ; Castile soap, of each, one ounce ; oil of cloves, one fluid drachm ; treacle, *by weight*, ten drachms : reduce the soap to a fine powder, and mix it with the colocynth, aloes, and scammony; then rub all together with the oil of cloves and treacle, and beat them into a mass of a uniform consistence," D. "Extract of colocynth, ʒj.; extract of aloes, powdered, ʒvj.; scammony, powdered, ʒij.; cardamom, powdered, ʒss.; soft soap, ʒiss.; mix the powders, add the other ingredients and beat all into a mass," L.) Dose, gr. v. to gr. xv.

Pilulæ Colocynthidis et Hyoscyami, E. (Colocynth pill mass, 2 parts; extract of hyoscyamus, 1 part; beat well together, adding a few drops of rectified spirit if necessary; and divide into five grain pills.) An excellent preparation, peculiarly adapted for persons with irritable bowels. Dose, one to three pills.

Enema Colocynthidis, L. (Extract of colocynth, ʒss.; soft soap, ℥j.; water, Oj.; mix and rub together.) An efficient enema in obstinate constipation and colic.

Tinctura Colocynthidis, (Colocynth, ℥j.; star anise, ʒj.; rectified spirit, f℥xiv.; digest for three days and filter.) Diuretic. Dose, min. x. to min. xv. in a mixture.

Decoctum Colocynthidis, (Colocynth, ʒj.; boiling water, f℥vj.; boil for ten minutes, strain, and add, sulphuric ether, fʒj.; syrup of orange peel, f℥j.) Diuretic. Dose, f℥ss. two or three times daily.

INCOMPATIBLES.—The fixed alkalies; lime water; sulphate of iron; acetates of lead; nitrate of silver; and corrosive sublimate.

CROTONIS TIGLII OLEUM, D. TIGLII OLEUM. L. CROTONIS OLEUM, E. *Croton oil. Expressed oil of the seeds of Croton tiglium.* A native of the continent of India, the Molucca Islands and Ceylon; belonging to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monadelphia.*

BOTANICAL CHARACTERS.—A moderate-sized tree, with a smooth bark; Leaves oblongo-ovate, acuminate, with two flat round glands at the base; Flowers, white, in terminal racemes; Fruit, ovate and triangular, somewhat bigger than a hazel nut, three celled, each cell one-seeded.

PHYSICAL PROPERTIES.—Croton seeds (*Grana Tiglii*) are of an irregularly-oval shape, about 6 lines long, 2½ lines thick, and 3 lines broad; they are of a greyish-brown colour, and marked with the ramifications of the raphé; they contain internally a pale yellowish-white albumen, which envelopes the embryo with its large leafy cotyledons. From the kernels, croton oil is obtained by pressure; it is thicker than castor oil, of a pale amber colour, has a feeble sickly odour, and an intensely acrid taste. The kernels yield about half their weight of oil.

CHEMICAL PROPERTIES.—Croton oil consists of a peculiar acid named *Crotonic acid* dissolved in a bland fixed oil; it was for a long time generally supposed that the properties of the oil were due to this acid, but Mr. Redwood has shown that neither crotonic acid nor its salts possess any cathartic action. In an essay lately read before the Academy of Medicine of Paris, by M. Dublanc, it is stated that the acid of croton oil is fixed and not volatile, and that the acrid volatile principle which exists in it is not of an acid nature. East Indian croton oil is insoluble in alcohol even with the aid of heat, but is very soluble in sulphuric ether, and in the fixed and volatile oils According to some experiments of the late Dr. Pereira, it would, however, appear, that croton oil expressed at home from the imported seeds is soluble in an equal volume of alcohol without the aid of heat, forming an uniform transparent mixture which does not separate on standing.

ADULTERATIONS.—Castor oil is the only substance employed to adulterate croton oil ; it was supposed that it might be readily detected by its solubility in alcohol, the test adopted by the Edinburgh College :—" when agitated with its own volume of pure alcohol and gently heated, croton oil separates on standing, without having undergone any apparent diminution ;" but Pereira's experiments above referred to prove that this is a fallacious test, especially as croton oil expressed in England is more active than that imported.

THERAPEUTICAL EFFECTS.—Croton oil is an acrid cathartic, operating speedily and producing frequent watery evacuations ; it does not in general give rise to nausea or griping, and is consequently to be preferred in most cases to other cathartics of equal power. It is used chiefly in obstinate constipation, in comatose affections, and in dropsy. In the various forms of convulsive and neuralgic diseases, it is a most valuable cathartic ; given in such affections in small doses, repeated daily for some time, I have in several cases found it a very efficacious remedy. Croton oil should not be employed in extreme debility, or where there is any tendency to inflammation in the digestive organs. (See, also, *Epispastics*).

DOSE AND MODE OF ADMINISTRATION.—Min. j. or min. ij. In cases where the patient is unable or unwilling to swallow, it may be dropped on the tongue, or having been dissolved in ether may be rubbed on the abdomen. If it can be avoided, however, croton oil should never be administered in a fluid form, as it causes a most disagreeable acrid impression in the back of the throat; it may be made into pill with conserve of roses or liquorice powder, or one or two minims may be added to any of the common purgative pill masses, and thus given in divided doses until it operates.

Sapo Crotonis, (Croton oil, 2 parts ; liquid caustic soda, 1 part.) Dose, gr. j. to gr. iij.

ELATERIUM, D. L. E. *Elaterium. The feculence from the juice of the fruit of Ecbalium agreste*, D.—*of Momordica elaterium*, E. *The fresh unripe fruit of Ecbalium officinarum*, L. The Wild or Squirting Cucumber is a native of Greece, and other parts of the South of Europe, and is cultivated in the British isles; it belongs to the Natural family *Cucurbitaceæ*, and to the Linnæan class and order *Monœcia Monadelphia.*

BOTANICAL CHARACTERS.—An annual, trailing plant, with a thick branching stem about two feet in length; grayish, rugose leaves, and yellow, axillary flowers; Fruit (*Pepo*), is about an inch and a half long, elliptical, green, covered with soft prickles; on quitting the foot-stalk when ripe, it suddenly, in consequence of the elastic structure of its parietes, discharges with considerable force many brown seeds and a slimy juice through the aperture at its base.

PREPARATION.—*Elaterium*, D. E. *Extractum Elaterii*, L. "Take of the fruit of Momordica elaterium, before it is quite ripe, any convenient quantity, cut the fruit and express the juice gently through a fine sieve; allow the liquid to rest until it becomes pretty clear; pour off the supernatant liquor which may be thrown away; and dry the feculence with a gentle heat," D. E. "Elaterium, ℔j.; slice it lengthwise, and strain the juice expressed very gently through the finest hair sieve; then set by for some hours until the thicker part subsides; dry this with a gentle heat, the supernatant thinner portion having been thrown away," L.

PHYSICAL PROPERTIES.—Elaterium is in thin, flat or slightly curled pieces or fragments, light and friable; of a pale, greenish-gray colour, with a very faint odour, but an intensely acrid and bitter taste; the pieces generally bear on the surface an impression of the linen on which they have been dried. An inferior quality, sometimes met with, is of a brownish or dark green colour, very hard, and broken with difficulty.

CHEMICAL PROPERTIES—According to Hennell's analysis, elaterium consists of a crystalline substance (*Elaterin*), green resin, starch, woody fibre, and saline matters. Elaterin, the active principle of the drug, may be obtained by exhausting elaterium thoroughly with boiling rectified spirit, concentrating this solution so long as no separation takes place, and then pouring it while hot into a weak boiling solution of potash; on cooling, the elaterin crystallizes in minute, colourless, satiny crystals; its formula is said to be $C^{20}H^{14}O^{5}$; the quantity obtained varies, in proportion to the quality of the drug employed, from 5 to 26 per cent.

ADULTERATIONS.—Elaterium is seldom expressly adulterated, but it varies much in strength, owing probably to the different degrees of care bestowed on its preparation; the best test for ascertaining its goodness is the process given above for obtaining its active principle; the quantity of *elaterin* thus procured "should weigh from a seventh to a fourth of the elaterium," *Edinburgh Pharmacopœia.*

THERAPEUTICAL EFFECTS.—Elaterium is a most powerful drastic cathartic even in minute doses, 1-16th of a grain sometimes producing considerable purging, and 1-4th of a grain, in dropsical cases, generally causing a discharge of several pints of fluid by the bowels; its operation is characterized by nausea, sometimes vomiting, and considerable depression of the circulatory and nervous systems. The chief use of elaterium is in passive dropsies, especially ascites and hydrothorax, when it is deemed advisable to attempt the removal of the effused fluid by the bowels. It will also be generally found, that diuresis is more freely established after the operation of elaterium. The administration of elaterium requires the greatest caution in debilitated habits.

DOSE AND MODE OF ADMINISTRATION.—1-16th to 1-4th of a grain in pill, (it should be always given at first in small doses), in combination with some tonic extract, as of gentian or chamomile.

Pulvis Elaterii compositus, (Elaterium, gr. iv. ; bitartrate of potash, ℈v. ; ginger, ℈ij. ; mix.) Thirty-six grains contain one grain of elaterium. Dose, gr. v. to gr. x.

Tinctura Elaterii, (Elaterium, gr. viij. ; rectified spirit, f℥viij. ; dissolve.) Dose, fʒss. to fʒij.

Solutio Elaterinæ, STIRLING. (Elaterin, gr. j. ; rectified spirit, f℥j.; nitric acid, min. iv. ; dissolve.) Dose, min. xxx. to min. xl.

In poisoning with elaterium, the same treatment should be followed as in poisoning with gamboge.

EUPHORBIA LATHYRIS.—*Caper Spurge.* An indigenous biennial, belonging to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monandria.* It is not officinal in any of the British pharmacopœias, but an oil obtained from the seeds is contained in the Paris Codex, as a cheap and efficient substitute for croton oil ; it is procured by simple pressure from the ripe seeds, 44 parts of oil being obtained from 100 parts of the seeds. It is very fluid, of a clear yellow colour, with an acrid taste and a peculiar odour ; soluble in ether, but insoluble in alcohol.

Calderini, an Italian physician, has used this oil extensively. He says that its effect is certain and prompt ; that it may be considered as a mild cathartic, not producing either vomiting, colic, or tenesmus ; and that it is adapted for all cases in which it is desirable to purge gently but effectually, and with a small dose of medicine. I have tried some experiments with the oil of the caper-spurge, thinking that it might be an indigenous cathartic of some value, but the results I have arrived at do not at all corroborate the statements of the French and Italian physicians, which may probably depend on some difference in the oil extracted from the seeds of the plant cultivated in our temperate climate, and that obtained from plants grown in warmer countries. The dose is from min. iv. to min. viij., it may be administered in syrup.

When applied externally, it is said to possess rubefacient properties similar to those of croton oil.

HELLEBORUS, L. E. *Root (and rhizome, L.) of Helleborus niger ; Black Hellebore, or Christmas rose.* The black hellebore, the Melampodium of the ancients, a native of the middle and southern parts of Europe, belongs to the Natural family *Ranunculaceæ* and to the Linnæan class and order *Polyandria Polygynia.*

BOTANICAL CHARACTERS.—Herbaceous ; Leaves all radical, pedatisect ; Scape leafless, one to two flowered ; Flowers large, white.

PREPARATION.—The root should be dug up in February, after the plant is done flowering, and dried quickly.

PHYSICAL PROPERTIES.—As met with in the shops the root consists of two parts, a black root-stock, and numerous undivided fibres or radicals which arise from it; the latter are the active part and should only be used, notwithstanding both are officinal in the last edition of the London Pharmacopœia. They are cylindrical, about the thickness of a crow-quill, brownish-black externally, whitish within, brittle; with a faint unpleasant odour, and a somewhat acrid, bitter taste, but the acridity is much lost in drying.

CHEMICAL PROPERTIES.—Black hellebore root contains a volatile oil, an acrid volatile acid, and other unimportant substances. Both water and alcohol extract its active properties, which probably depend on the volatile acid.

ADULTERATIONS.—Various other roots are substituted for, or intermixed with, black hellebore root on the continent; but in consequence of the limited employment of the drug, the fraud is but very rarely practised in this country, nevertheless I have recently had an instance of it brought under my notice. The root should be constantly renewed, as it loses its properties by keeping.

THERAPEUTICAL EFFECTS.—This substance is classed among the vegetable irritant poisons, but in medicinal doses it operates as a drastic cathartic; and although little esteemed in modern practice, was highly prized by the ancients as a purgative in cerebral and nervous disorders and in dropsy; it was also said to possess emmenagogue and anthelmintic properties

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. iij. to gr. xij.

Tinctura Hellebori, L. (Hellebore, bruised, ℥v.; proof spirit, Oij.; macerate for 7 days, express and strain.) Dose, fʒj. to fʒij.

HYDRARGYRUM CUM CRETA, D. L. E.—*Mercury with chalk.*

PREPARATION.—"Take of pure mercury, one ounce; prepared chalk, two ounces: rub the mercury and chalk in a porcelain mortar, until the metallic globules cease to be visible, and the mixture acquires a uniform grey colour," D. "Triturate together mercury, ℥iij. and prepared chalk, ℥v., till the globules disappear," L. E.

PHYSICAL PROPERTIES.—A greyish, heavy, insoluble powder; void of odour, but having an astringent, metallic taste.

CHEMICAL PROPERTIES.— According to the recent investigations of many celebrated chemists, this preparation appears to consist of metallic mercury in a state of minute division, suboxide of mercury, and carbonate of lime combined mechanically; but in what proportion the metal and oxide exist has not been yet ascertained. On the addition of the stronger acids to the powder effervescence takes place; and by exposure to heat the mercury is volatilised.

THERAPEUTICAL EFFECTS.—A gentle cathartic and alterative, peculiarly adapted for infancy and childhood, promoting and improving the secretions of the liver, pancreas, and intestines. In combination with rhubarb, it is employed with much benefit in the diarrhœa of children when the stools are clay-coloured, and when there is acidity of the primæ viæ. Prescribed with dried carbonate of soda, it is our most useful alterative in the cutaneous affections of infancy and childhood. (See, also, *Special Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. ij. to gr. v., for children; it is seldom prescribed as a cathartic for adults, the dose would be from gr. x. to ʒss., in which quantity salivation would probably result from its administration.

INCOMPATIBLES.—The mineral acids; acetic acid; alum; and all sulphates.

HYDRARGYRUM CUM MAGNESIA, D.—*Mercury with Magnesia.*

Prepared in a similar manner to the last, carbonate of magnesia being employed instead of prepared chalk. Its properties would appear to be nearly similar, but it acts with greater certainty as a cathartic, and is consequently to be preferred in many cases. (See, also, *Special Stimulants*).

HYDRARGYRI PILULÆ, D. L. E.—*Pills of Mercury. Blue pill.*

PREPARATION.—"Pure mercury, ℥ij.; confection of roses, ℥iij.; liquorice root, in fine powder, ℥j.: rub the mercury with the confection, until the metallic globules are no longer visible, then add the liquorice powder, and mix the whole well together," D. "Mercury, ℥ss.; confection of roses, ʒvj.: liquorice powder, ʒij.; rub the mercury with the confection until globules are no longer visible, then, the liquorice powder being added, beat the whole into a mass," L. "Mercury, two parts; liquorice-root, one part; conserve of red-roses, three parts: beat the mercury and conserve till globules can no longer be detected; add the liquorice-root, and beat the whole again into a proper mass, which is to be divided into five-grain pills," E.

PHYSICAL PROPERTIES.—A soft pill mass, of a dark blue colour.

CHEMICAL PROPERTIES.—This preparation, like the two last, probably consists of metallic mercury in a state of minute division combined with the suboxide of mercury. Three grains of the pill contain one grain of mercury.

ADULTERATIONS.—If the pill mass be prepared with confection of roses to which sulphuric acid had been added, as is sometimes done to brighten its colour, it will contain subsulphate of mercury which possesses very irritating properties. This may be detected by triturating the mass with boiling water, and adding to the filtered liquor solution of nitrate of baryta; if any sulphate be present, a white precipitate insoluble in nitric acid will be produced. The blue pill mass sold in the United States, and which is often exported from England, is constantly largely adulterated with a blue earthy matter, and with Prussian blue, starch, &c; this fraud which is easy of detection has been but very rarely practised in this country.

THERAPEUTICAL EFFECTS.—Although blue pill is most generally employed to produce the specific effect of the mercurial preparations, in full doses it operates as a cathartic. In consequence of its general alterative powers, and the peculiar property it possesses of improving and stimulating the biliary secretions, it is commonly prescribed in combination with the different cathartic pill masses, particularly the compound colocynth pill. Thus combined, taken at night, and followed by an active purgative draught in the morning, it is found especially useful in the milder forms of derangement of the biliary organs. (See, also, *Special Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—Given alone as a cathartic, gr. xij. to gr. xx. ; combined with other purgatives, gr. v. to gr. viij.

JALAPA, D. L. E. *Root (Tuber,* L.*) of Exogonium purga (Bentham),* D. L.—*of Ipomœa purga (Nees Von Esenbeck),* E. *Jalap.* The officinal jalap root is now well known to be obtained from the plant indicated above according to the nomenclature of different botanists. It is a native of Mexico and Vera Cruz ; and belongs to the Natural family *Convolvulaceæ,* and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Roots tuberous, incrassated ; Stems, herbaceous, smooth, climbing ; Leaves, greenish, alternate, petioled, cordiform ; Flowers, large, one to three, on axillary peduncles ; corolla, large, campanulate, white, with a reddish-purple centre.

PREPARATION.—The root is dug up, at the time the young shoots begin to appear, and dried by exposure to the air, or suspended in net bags over a fire.

PHYSICAL PROPERTIES.—Jalap root is met with in commerce in pieces varying much both in size and form. The entire tubers are ovoid, from the size of a nut to that of an orange, generally incised more or less deeply and in different directions ; externally rugose, compact, dark-brown ; whitish or yellowish within, marked with concentric zones. The flat pieces are merely transverse slices of the entire tubers. The fracture of jalap root is marbled and compact, presenting many brilliant points (resin) ; the odour is faint, but very nauseating ; the taste, nauseous and acrid. It is pulverised with difficulty.

CHEMICAL PROPERTIES.—Jalap is composed of hard and soft resin, bitter extractive, gummy extractive, albumen, uncrystallizable sugar, gum, mucilage, starch, and colouring matter. The resin, its active principle, exists in the proportion of from ten to fourteen per cent. ; it is soluble in alcohol, while water dissolves only the non-cathartic components of the root. The starch is often eaten by insects ; such pieces are said to be worm-eaten, they are the most active as they contain in proportion to their weight more resin. Jalap resin is of a slightly yellow colour, odourless and tasteless when pure ; insoluble in water, but readily soluble in alcohol. It assumes a beautiful crimson colour when moistened with strong sulphuric acid, and allowed to stand for a quarter of an hour, which colour disappears on the addition of water. The soft resin may be readily separated from the hard acid resin, the former being soluble in ether while the latter is not.

ADULTERATIONS.—Jalap root, as met with in English commerce, can be scarcely said to be adulterated; at one time slices of white Bryony root were mixed with it, but the white colour and intense bitterness of the spurious root rendered the fraud easy of detection. On the Continent many forms of spurious or counterfeit jalaps are mixed with the true root; they may, for the most part, be distinguished by being very rugose, of a reddish or rose colour internally, not compact, with a faint odour, and almost insipid. The purity of jalap resin may be readily ascertained by its action with sulphuric acid, as the beautiful crimson colour above described is not manifested if any other resin be present: the most ordinary adulteration is with resin of guaiacum. This admixture gives a red colour with sulphuric acid, which becomes greenish on the addition of water if even the sixtieth part of guaiacum resin be contained in the specimen tested.

THERAPEUTICAL EFFECTS.—Jalap is a powerful cathartic, operating principally upon the small intestines; administered in too large a dose, it causes violent hypercatharsis and inflammation. In medicinal doses it is certain in its operation, increasing the peristaltic action and promoting the secretions and exhalations of the alimentary canal without causing any irritation; consequently it is frequently and beneficially prescribed for children. Its chief use as a cathartic, is in simple constipation without inflammation, in ascites, in scrofulous affections, and in verminous diseases: in the two latter it is beneficially combined with calomel; in dropsy, with cream of tartar. It sometimes causes salivation, if its use be long persisted in. Jalap produces purging if applied to a wound or to the surface of the body, the cuticle having been previously removed by means of a blister.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to gr. xxx., for an adult; gr. ij. to gr. viij. for children; it may be given made into a bolus, or suspended in water or any simple decoction.

Pulvis Jalapæ compositus, D. L. E. ("Take of Jalap, in fine powder, ℥ij.; bitartrate of potash, ℥iiiss.; ginger in fine powder, ℥ss.; mix thoroughly by trituration, and pass the powder through a fine sieve," D. "Jalap powder, ℥iij.; bitartrate of potash, ℥vj.; ginger, ʒij.; rub separately to powder, and mix," L. "Jalap powder, ℥j.; bitartrate of potash, ℥ij.; triturate them to very fine powder," E.). Hydragogue cathartic; Dose, ʒss. to ʒiss.

Extractum Jalapæ, L. (Jalap root, powdered, ℔iiss.; rectified spirit, cong. j; distilled water, cong. ij.; macerate in the spirit for four days, and pour off the tincture; boil down the residue in the water to cong. ss.; then strain the tincture and the decoction separately, evaporate the latter, and distil the former until each thickens; lastly, mix the extract with the resin, and evaporate to a proper consistence; this extract should be kept *soft* to form pills, and *hard* for powdering.) Dose, gr. x. to ℈j.

Extractum sive Resina Jalapæ, E. (Take any convenient quantity of jalap in moderately fine powder; mix it thoroughly with enough of rectified spirit to moisten it well; put it in 12 hours into a percolator and exhaust the powder with rectified spirit; distil off the greater part of the spirit and concentrate the residuum over the vapour bath to a due consistence.) This is the impure resin; the dose is from gr. iij. to gr. x.; it should be given in a state of minute division, for which purpose it may be rubbed with sugar or some mild powder, or made into an emulsion with milk, sugar, and almonds.

Sapo Jalapinus, (Castile soap; and jalap resin, equal parts; rectified spirit, a sufficiency; dissolve and evaporate with a gentle heat to the consistence of a conserve.) Dose, gr. xij. to ℈j., for adults; gr. iij. to gr. vj., for children.

Tinctura Jalapæ, D. L. E. ("Jalap, in coarse powder, ℥v.; proof spirit, Oiss.; macerate for 14 days, strain, express and filter," D. "Jalap, coarsely powdered, ℥v.; proof spirit, Oij.; macerate for 7 days, express and filter," L. "Jalap, in moderately fine powder, ℥vij.; proof spirit, Oij.; this tincture may be prepared either by percolation or digestion, as directed for tincture of capsicum," E.) The London tincture is weaker than that of either Dublin or Edinburgh. Dose, fʒj. to fʒiv.

LINUM CATHARTICUM, E.—*Purging-flax*. A slender indigenous annual, from two to six inches high, with small white flowers drooping before expansion. It belongs to the Natural family *Linaceæ*, and to the Linnæan class and order *Pentandria Monogynia*. The whole herb is officinal, it is void of odour, but has an intensely bitter taste. It was formerly held in high esteem as a cathartic and diuretic; at present it is never used in regular practice, and has been only retained in the Edinburgh Pharmacopœia on the authority of Dr. Christison, as a useful indigenous cathartic in doses of a drachm of the powder, or an infusion of two or three drachms of the herb.

MAGNESIA. *Magnesia* (described in the division *Antacids*,) given in full doses operates as a gentle cathartic; its effect, however, being by no means uniform or certain, depending probably on the quantity of free acids in the stomach, by union with which it forms soluble magnesian salts. It does not increase the secretions of the intestines, but by stimulating their muscular fibres, causes the evacuation of their contents. Magnesia is very generally employed as a purgative in infantile diseases, and by females and persons of a delicate habit of body; it is most usually combined with rhubarb, a combination frequently employed and with much benefit in the early stages of diarrhœa, particularly when dependent on irritation or acidity of the primæ viæ. Magnesia when taken for a long period has in some instances accumulated to a great extent and even formed concretions in the bowels. Should it therefore be thought advisable to continue its use for any time, it will be necessary to administer an active cathartic occasionally. Dose, ℈j. to ʒj. for adults; gr. ij. to gr. x. for children.

MAGNESIÆ CARBONAS. *Carbonate of Magnesia* (described in the division *Antacids*) is a still milder cathartic, it is employed in the same cases, but is used less frequently than magnesia, in consequence of its producing flatulence from the disengagement of carbonic acid in the stomach. Dose, ʒj. to ʒij. for adults; gr. x. to ℈j. for children. Some French practitioners have stated that they noticed the disappearance of warts, from the hands of persons who had been taking the carbonate of magnesia for some time, and have consequently recommended its use to individuals affected with these unsightly growths. A mildly laxative effervescing draught may be prepared with a drachm of carbonate of magnesia, the juice of one lemon, and a wineglassful of water. The solution of the bicarbonate of magnesia acts as a gentle laxative in doses of from f℥ij. to f℥iv.; its activity may be increased and an agreeable effervescing draught of citrate of magnesia formed by the addition of lemon juice or citric acid. The latter in the proportion of ʒss. of the crystals dissolved in water for each ounce of the fluid magnesia.

MAGNESIÆ SULPHAS, D. L. E. *Sulphate of Magnesia. Epsom Salts.*

PREPARATION.—An article of the Materia Medica; it was formerly prepared by evaporating the waters of the Epsom springs; at present various processes are followed by different manufacturers, which it would be out of place to enter into any account of here.

PHYSICAL PROPERTIES.—Usually met with in small acicular crystals, transparent and colourless; inodorous; with an extremely bitter, disagreeable taste. By slow crytallization tolerably large crystals are readily obtained, their form is, the four-sided rhombic prism with reversed dihedral summits, or four-sided pyramids. Specific gravity 1·66.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of magnesia, 1 of acid, and 7 of water, ($MgO, SO^3, HO+6HO$). It is permanent in the air, but in a slightly increased temperature effloresces, losing 6 equivalents of water at a temperature considerably under 300°, first fusing in its water of crystallization; if the temperature be raised still higher it becomes anhydrous, and undergoes the igneous fusion, but is not decomposed. It dissolves in its own weight of water at 60°, and in three-fourths of its weight of boiling water. It is insoluble in alcohol.

ADULTERATIONS.—At present this salt is met with in a state of great purity; sometimes, however, when prepared from bittern it contains chloride of magnesium, which being very deliquescent, is readily recognized. On the continent in the present day, and formerly also in this country, crystals of sulphate of soda, which is a much cheaper salt, are fraudulently mixed with those of sulphate of magnesia; the sophistication is best detected by the test of the Edinburgh Pharmacopœia, which is intended to show that the full proportion of magnesia is present:—" ten grains dissolved in f℥j. of water, and treated with solution of carbonate of ammonia, are not entirely precipitated by 280 minims of solution of phosphate of soda, (1 of salt, to twenty of water)." The characteristics and tests of this salt given in the last edition of the London Pharmacopæia are as follow: " not deliquescent in the air, soluble in water; sulphuric acid dropped into the solution does not expel any hydrochloric acid."

THERAPEUTICAL EFFECTS.—Sulphate of Magnesia is a refrigerant cathartic, operating mildly but effectually, augmenting the secretions and promoting the peristaltic action of the intestinal canal; the evacuations are watery, and are not attended with either nausea or griping. It is consequently more generally employed at present than perhaps any other medicine of this class; it has also the advantage of great cheapness. This salt is peculiarly adapted for all forms of febrile and inflammatory affections, especially when accompanied by constipation. In short, there are but few diseases in which cathartics are indicated, that it may not be employed in with benefit. Sulphate of magnesia forms the active ingredient in many mineral waters.

DOSE AND MODE OF ADMINISTRATION.—ʒij. to ℥j. dissolved in seven or eight times its weight of water. Its cathartic properties are promoted by dilution, therefore a smaller dose than usual will suffice, if dissolved in a large quantity of water; tincture of some aromatic bitter, as of cascarilla, calumba, orange peel, &c. may be added with advantage to the solution to conceal its nauseous taste; this is best done, however, by the addition of ten or twelve minims of dilute sulphuric acid, or by administering the salt in the acid infusion of roses, an elegant and beneficial form in febrile diseases.

Pulvis Salinus compositus, E. (Pure muriate of soda; and sulphate of magnesia, of each, ℥iv., sulphate of potash, ℥iij.; dry the salts with a gentle heat, and pulverise them separately; then triturate them well together, and keep in a well-closed vessel.) Dose, ʒij. to ℥ss. dissolved in Oss. of water. In the preparation of this powder, instead of the sulphate of potash, I have employed ℥iv. of sulphate of soda, using a sufficiently high temperature to expel all the water of crystallization from each of the salts, and found the resulting compound a more effectual cathartic in smaller doses; ʒj. dissolved in half a pint of water, and taken in the morning before breakfast, in general operating freely and with perfect safety.

Enema Catharticum, D. E. (Take of sulphate of magnesia, ℥j.; olive oil, f℥j.; mucilage of barley, f℥xvj. Dissolve the sulphate of magnesia in the mucilage, add the oil, and mix," D. "Olive oil, ℥j.; sulphate of magnesia, ℥ss.; sugar, ℥j.; senna, ℥ss.; boiling water, f℥xvj.; infuse the senna in the water for an hour; then dissolve the salt and the sugar, and add the oil," E.). A useful cathartic enema for general purposes.

INCOMPATIBLES.—The alkaline carbonates; lime water; muriate of ammonia; chloride of calcium; chloride of barium; the acetate of lead; and nitrate of silver. The bicarbonates of the alkalies are not incompatible with sulphate of magnesia, unless at the temperature of boiling water.

MANGANESIÆ SULPHAS. *Sulphate of Manganese.* This salt, which is left as the residue in the preparation of oxygen gas by heating together black oxide of manganese and sulphuric acid, acts as a cathartic when administered in doses of from one to six drachms dissolved in a large quantity of water. It seems to stimulate the parenchymatous viscera of the abdomen, particularly the liver, to increased secretion, as the evacuations caused by it contain a large quantity of bile. It is rarely used at present, but some years since was brought under the notice of the profession by Dr. Ure of London, as likely to prove a useful purgative in gouty affections. In several cases in which I tried it I found its action very uncertain, and its disagreeable styptic taste a great objection to its use. Sulphate of manganese should be always combined with some other cathartic, as with senna, for if given alone it is apt to produce vomiting. The salts of manganese have been recently highly commended by some French writers as useful adjuncts to preparations of iron when circumstances indicate the administration of the latter. This matter will be referred to in the chapter on Tonics, when treating of the therapeutical uses of that metal.

MANNA, D. L. E. *An exudation from Fraxinus ornus and other species, constitutes the Manna of commerce,* D.—*The juice, hardened in the air, flowing from incisions into the bark of Fraxinus rotundifolia, and Fraxinus ornus?* L.—*Sweet concrete exudation, probably from several species of Fraxinus and Ornus,* E. Nearly all the species of the genera Fraxinus and Ornus yield manna, but the greater portion of what occurs in commerce is obtained from the Fraxinus rotundifolia; a native of the South of Europe, chiefly of Sicily and the South of Italy. It belongs to the Natural family *Oleaceæ* and to the Linnæan class and order *Diandria Monogynia.*

BOTANICAL CHARACTERS.—Fraxinus ornus is a small tree; Leaves opposite, pinnate; Panicles, large, many flowered; Flowers, small, polygamous, white; the whole tree resembles much in appearance the common ash of our climate. Fraxinus rotundifolia is by many considered to be a variety of Fraxinus ornus; the chief difference between them is in the shape of the leaves.

PREPARATION.—The juice of the stem exudes spontaneously either from fissures in the bark, through the punctures of insects, or more usually from incisions made expressly with a hooked knife. It concretes rapidly on the tree, and is then removed by the hand.

PHYSICAL PROPERTIES.—Two sorts are commonly met with in the shops. 1st.—Flake manna, *Manna cannellata;* it occurs in stalactiform pieces, from one to six inches in length, and one or two inches in width, uneven, rugged, porous and friable; of a dull yellowish white colour; presenting a furrow on the surface by which they adhere to the tree, on which side they are usually somewhat soiled. It has a faint, somewhat nauseous odour, and a sweetish insipid taste. 2nd.—Fatty manna, *Manna pinguis;* it is in soft, viscid fragments of a brownish-yellow colour, much soiled and mixed with impurities; its odour is very nauseous, and its taste viscid and disagreeable.

CHEMICAL PROPERTIES.—Manna consists of a peculiar saccharine principle named *Mannite,* uncrystallizable sugar, gummy matter, nitrogenous matter and moisture; it contains about 40 per cent. of mannite and about 10 per cent. of sugar. It softens with the heat of the hand, and melts at a temperature a little higher; is soluble in three parts of water at 60°, and in eight parts of rectified spirit. Mannite, its active principle, may be obtained by boiling manna in alcohol, and pouring off the spirit, from which as it cools the mannite is deposited in crystals. Its composition is $C^{12} H^{14} O^{12}$.

Flake manna, which is alone employed in medicine, is not liable to adulteration.

THERAPEUTICAL EFFECTS.—Manna is a very mild laxative, employed only in the diseases of children and delicate females; in the present day it is seldom administered alone, being generally used for sweetening cathartic mixtures. When first gathered, manna does not possess any laxative properties, and is employed as a nutritive article of diet in the countries where it is produced.

DOSE AND MODE OF ADMINISTRATION.—For children, ʒj. to ℥ss., for adults, ℥j. to ℥ij.—*Mannite,* for children, ʒss. to ʒij., for adults, ℥ss. to ℥j. Manna which has become hard by keeping forms an excellent excipient for forming the more active insoluble powders into pills.

MEL, D. L. E. *Saccharine secretion of Apis mellifica,* D. E.—*Juice extracted from flowers, deposited in the honeycomb by the Apis mellifica, despumated,* L. *Honey.* Honey is secreted by the nectaries of most flowers, from whence it is collected by the Bee, an insect belonging to the order *Hymenoptera;* in the honey-bag of the insect, which is a dilatation of the œsophagus, it probably undergoes some alteration previously to its deposition in the cells of the honey-comb. Honey is too well known to need description ; it is composed of grape-sugar, cane-sugar, mannite, acetic acid, aromatic principle, wax, &c. It is sometimes adulterated with sand, with starch, or with wheaten or pea flour ; the first adulteration may be detected by dissolving in water ; the others by the action of tincture of iodine on the cooled decoction, which is rendered blue if any fecula be present. Dissolved in a large quantity of water, honey possesses demulcent and cooling properties ; in a small portion of water it operates as a mild laxative. It is now but little used in medicine ; nevertheless, eaten at breakfast it is found very beneficial by persons liable to habitual constipation. Honey has in some instances proved poisonous, in consequence of having been collected by bees from poisonous flowers. By melting honey in a water bath and straining while hot through flannel, Clarified honey, *Mel Depuratum*, D., is prepared. Both the flavour and odour of honey are injured by this process.

OLIVÆ OLEUM, D. L. E. *Oil obtained from the pericarp* (*expressed from the fruit*, L.) *of Olea Europæa.* This tree, originally a native of Asia Minor, now grows freely on the borders of the Mediterranean, and is cultivated all over the south of Europe, especially in Provence. It belongs to the Natural family *Oleaceæ*, and to the Linnæan class and order *Diandria Monogynia.*

BOTANICAL CHARACTERS.—A moderately sized tree with hard, veined wood ; Leaves, in pairs, acute, hoary beneath, giving a whitish character to the foliage ; Flowers, small, white ; Drupe, elliptical, dark-bluish-green, with a hard nut generally one seeded.

PREPARATION.—The finer sorts of the oil are obtained by simply pressing the fresh ripe fruit in a mill ; a second sort, by moistening the marc, left after the first expression, with boiling water, and repressing it ; and a third, and very inferior sort, by boiling this cake in water, and submitting it to very strong pressure.

PHYSICAL PROPERTIES.—Olive oil is a transparent, limpid, unctuous fluid, of a yellow colour, pale or greenish according to quality (the finer sorts being of a lighter shade) ; when good, odourless, with a bland, sweetish taste : by keeping it acquires both a rancid odour and taste, more slowly, however, than the other fixed oils. Specific gravity ·911 at 77° F.

CHEMICAL PROPERTIES.—It is composed of 72 parts of *elaine*, and 28 of *margarin*. Olive oil readily saponifies : exposed to the air, even in thin layers, it thickens but does not dry. It congeals at 36° F. ; is insoluble in water or in alcohol, but at 59° it dissolves in once and a half its weight of ether.

ADULTERATIONS.—Cheaper vegetable oils, as poppy-oil, sesame oil, cocoa-nut oil, and rape-seed oil, are commonly employed to adulterate olive oil. The best test for ascertaining its purity is that of Poutet, by means of which 5 per cent. of adulteration can be detected; it has been adopted in the last edition of the Edinburgh Pharmacopœia:—"mix with a twelfth of its volume of solution of nitrate of mercury, prepared by dissolving with a gentle heat, ℥iv. of mercury in f℥ixss. of nitric acid (density, 1380 to 1390); if pure, it becomes in three or four hours like a firm fat, without any separation of liquid oil." For ordinary purposes the presence of other fixed oils may be more readily ascertained, by shaking the oil in a bottle half filled, when, if it be pure, the surface of the oil soon becomes smooth by repose, but if it be adulterated, a number of air bubbles, *beads,* remain.

THERAPEUTICAL EFFECTS.—It is seldom given by the mouth as a cathartic, but forms an admirable addition to *laxative enemata,* in inflammation or spasms of the intestines, in dysentery, or in irritation of the urino-genital organs. (See, also, *Emollients.*) The leaves of the olive tree have been often administered as a febrifuge with excellent effect.

DOSE AND MODE OF ADMINISTRATION.—f℥j. to f℥ij. by the mouth; f℥ij. to f℥iv. in an enema with decoction of barley.

POTASSÆ ACETAS, D. L. E. *Acetate of Potash.*

PREPARATION.—"Take of pure carbonate of potash, one pound; acetic acid of commerce (specific gravity, 1044), two pints. To the acid, placed in a porcelain capsule, gradually add the carbonate of potash, and, when effervescence has ceased, boil for a couple of minutes. Add now, if necessary, a few drops of the same acetic acid, so that the solution may have a slightly acid reaction, and having evaporated to dryness, melt the residue, by the cautious application of heat, in a clean pot of cast iron. The liquefied salt is now to be removed from the fire, and when, upon cooling, it has solidified, it should be quickly broken into fragments of a suitable size, and enclosed in a bottle furnished with an air-tight stopper," D. "Acetic acid, f℥xxvj.; carbonate of potash, ℔j. or a sufficiency; distilled water, f℥xij.; to the acid mixed with the water gradually add the carbonate to saturation; then strain, and evaporate the solution in a sand-bath, the heat being cautiously applied, until the salt is dried," L. "Pyroligneous acid, Oiss.; carbonate of potash (dry), ℥vij. or a sufficiency; add the carbonate gradually to the acid till complete neutralization be accomplished; evaporate the solution over the vapour-bath till it is so concentrated as to form a concrete mass when cool; allow it to cool and crystallize in a solid cake, which must be broken up and immediately put into well-closed bottles," E.

PHYSICAL PROPERTIES.—Masses of white, needle-shaped, satiny, crystals, odourless when dry, but emitting a faint acetous odour, when moistened; they have a pungent, somewhat acrid but cooling taste; and are soapy to the touch. Specific gravity, 2·10.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potash, and 1 of anhydrous acetic acid ($KO, C^4H^3O^3$); it deliquesces on exposure to the air, and is very soluble both in water and in alcohol; by heat it is fused, and if the heat be increased is decomposed, *pyro-acetic spirit* being driven off and *carbonate of potash left.*

ADULTERATIONS.—This salt is scarcely liable to adulteration; it should be snow-white, and perfectly neutral. The following are the characteristics and tests for it, contained in the last edition of the

London Pharmacopœia :—" Soluble in rectified spirit and in water; the solution in water is neutral : chloride of barium and nitrate of silver give no precipitate with it ; if the solution be strong, then any precipitate which the latter may occasion is redissolved on the addition of dilute nitric acid or water; sulphuric acid added to it, emits acetic vapours. 100 grains digested in sulphuric acid, evaporated to dryness and exposed to a red heat, yield 88·8 grains of sulphate of potash."

THERAPEUTICAL EFFECTS.—Scarcely ever used as a cathartic, nevertheless in sufficient doses it operates effectually, producing watery evacuations, and is therefore, independently of its diuretic properties, well adapted for dropsical diseases. (See, also, *Diuretics*).

DOSE AND MODE OF ADMINISTRATION.—As a cathartic, ʒij. to ʒiij. dissolved in a large quantity of water.

INCOMPATIBLES.—The mineral acids, and their soluble salts; and tartaric acid.

POTASSÆ BISULPHAS, D. E. *Bisulphate of Potash.*

PREPARATION.—" Take of sulphate of potash in powder, three ounces; pure sulphuric acid, one fluid ounce: Place the acid and salt in a small porcelain capsule, and to this apply a heat capable of liquefying its contents, and which should be continued until acid vapours cease to be given off. The bisulphate, which concretes as it cools, should be reduced to a fine powder, and preserved in a well-stopped bottle," D. " Take of the residuum in the preparation of pure nitric acid, ℔ij. ; sulphuric acid of commerce, f℥vij. fʒj. ; boiling water, Ovj. ; dissolve the salt in the water, add the acid, concentrate the solution, and set it aside to cool and form crystals," E.

PHYSICAL PROPERTIES.—In minute, transparent crystals which belong to the right prismatic system ; odourless, with a very acid and bitter taste. Specific gravity, 2·163.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of sulphuric acid, 1 of potash, and 1 of water ($HO, SO^3 + KO, SO^3$); the excess of acid acting upon metals and alkaline bases very much as if it were free. The crystals are permanent in the air, and are soluble in about twice their weight of water at 60°; the solution has a strongly acid reaction. By a red heat, the water of crystallization and half the acid are expelled, and sulphate of potash remains.

THERAPEUTICAL EFFECTS.—Rarely employed in medicine ; it operates as a mild cathartic, and as its after effects are tonic, it may be used with advantage in debilitated habits ; combined with rhubarb much of its nauseous taste is concealed, and its cathartic properties promoted. Many years ago, Dr. Barker proposed a solution of 73 grs. of this salt, mixed with a solution of 72 grs. of carbonate of soda, as a cheap effervescing purgative draught, but it forms an extremely nauseous compound.

DOSE AND MODE OF ADMINISTRATION.—ʒss. to ʒiss. dissolved in from f℥iij. to f℥vj. of water.

INCOMPATIBLES.—Alkalies, earths and their carbonates ; metallic salts; and tartaric acid.

POTASSÆ BITARTRAS, D. L. E. TARTARI CRYSTALLI, D. *Bitartrate of Potash, (in crystals,* L.*) ; Acid Tartrate of Potash ; Crystals of Tartar ; Crude Tartar ; Cream of Tartar.*

PREPARATION.—Bitartrate of potash is an article of the Materia Medica ; it is obtained by dissolving and recrystallizing *argol*, an obscurely crystalline substance, which concretes on the inside of casks in which new wine has been kept ; this constitutes the *Crystalli Tartari* of the *Dublin Pharmacopœia.* A purer salt is produced by redissolving these crystals, evaporating the solution slowly, and removing the crust as it forms on the surface, whence the name, *cream of tartar.*

PHYSICAL PROPERTIES.—This salt is met with in the form either of a fine white powder, or a semi-transparent crystalline mass, the crystals being oblique rhombic prisms ; it is without odour, but has an agreeable acid taste. Specific gravity, 1·953.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potash, and 1 of tartaric acid, combined in the crystalline state with 1 of water ($HO, KO, C^4H^2O^5$), it is therefore correctly speaking a monobasic tartrate ; it is unalterable in the air, is soluble in 184 parts of water at 68°, and in 18 parts of boiling water, the solution having a strongly acid reaction. By heat the salt is decomposed, and converted into a compound of charcoal and carbonate of potash *(Black Flux).*

ADULTERATIONS.—This salt in the state of powder is very much adulterated ; the substances commonly employed for this purpose are, finely powdered marble, alum, bisulphate of potash, and wheaten flour or starch. The tests of the Edinburgh Pharmacopœia will detect any of these impurities : " Entirely soluble in 40 parts of boiling water. Gr. xl. in solution are neutralized with gr. xxx. of crystallized carbonate of soda ; and when then precipitated with gr. lxx. of nitrate of lead, the liquid remains precipitable by more of the test."

THERAPEUTICAL EFFECTS.—In full doses cream of tartar operates as an active cathartic, producing many watery evacuations without much irritation. It is seldom prescribed singly, but, in general, with some of the milder vegetable cathartics. Thus, combined with sulphur in the form of electuary, it is an exceedingly useful purgative in hemorrhoidal affections and in various other diseases ; and with jalap, it forms an excellent cathartic in dropsies.

DOSE AND MODE OF ADMINISTRATION —ʒiij. to ʒvj. made into an electuary with honey or treacle. Its solubility in water may be much increased, without impairing its medicinal activity, by adding to it a fourth of its weight of boracic acid or borax.

Effervescing aperient with cream of tartar, (Cream of tartar, ʒiij. ; carbonate of soda, in crystals, ʒiiss. ; water, f℥viij.). For one dose.

INCOMPATIBLES.—The mineral acids ; the alkalies ; lime water ; the carbonates of potash and of soda ; acetate of lead ; and magnesia, and its sulphate.

POTASSÆ SULPHAS, D. L. E. *Sulphate of Potash.*

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. "Take of the residuum of the process for *Acidum Nitricum Purum*, one pound; fresh burned lime, six ounces; water, two quarts; carbonate of potash, from pearl-ash, one drachm; dilute sulphuric acid, six fluid drachms, or as much as is sufficient: Slake the lime in four ounces of the water, and having dissolved the residuum of the nitric acid process in the remainder of the water, and raised the solution to the temperature of ebullition, gradually add to it the slaked lime, until reddened litmus paper immersed in it is restored to a blue colour. Filter the solution through calico, and to it, raised to the boiling point, add the carbonate of potash, as long as there is any precipitate. Filter again, add the dilute sulphuric acid, so as to produce a neutral or very slightly acid solution, and, having evaporated this till a film forms on its surface, set it by for twenty-four hours. The crystals which will then have formed should be dried on blotting paper, and preserved for use," D. "Take of the residuum of the preparation of pure nitric acid, ℔ij.; boiling water, cong. ij.; white marble in powder, a sufficiency. Dissolve the salt in the water, add the marble gradually till effervescence ceases, and the solution is completely neutralized; filter the liquid, and evaporate it till a pellicle forms on its surface; then set it aside to cool and form crystals." E.

PHYSICAL PROPERTIES.—A solid white salt, crystallizing usually in single or double six-sided prisms, terminated by six-sided pyramids; inodorous, with a slightly bitter saline taste. The crystals are very hard, and are therefore employed in pharmacy for triturating and dividing vegetable powders. Specific gravity, 2·4.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potash, and 1 of sulphuric acid (KO, SO^3); is unalterable in the air; heated it decrepitates, and at a strong red heat fuses, but is not decomposed; it requires 9 parts of water at 60°, and 5 of boiling water for its solution, but is insoluble in alcohol.

ADULTERATIONS.—Sulphate of potash is seldom adulterated in this country; on the continent, however, it has been often found to contain sulphates of copper, of zinc, or of iron, and in some instances corrosive sublimate. The best tests of its purity are, the neutrality of the solution and its not precipitating with gallic acid, with ammonia, with hydro-sulphate of ammonia, or with sulphate of silver. The following are the characteristics and tests for the salt given in the last edition of the London Pharmacopœia:—"Slightly soluble in water; bichloride of platinum gives a yellowish and chloride of barium a white precipitate insoluble in nitric acid, with the solution. It crepitates when exposed to heat, and melts at a red heat without losing weight. 100 grains dissolved in distilled water, on the addition of chloride of barium and hydrochloric acid, yield a precipitate of 132 grains of sulphate of baryta when dried at a red heat."

THERAPEUTICAL EFFECTS.—In doses of from two to four drachms, this salt has occasionally produced symptoms of irritant poisoning; it is nevertheless a mild cathartic generally operating effectually, and with scarcely any disturbance of the system, but on account of its little solubility it is not much employed alone. It is not adapted for children, as it is apt to produce vomiting if given to them in even a moderate dose. Sulphate of potash is an excellent purgative for females after delivery, when it is wished to diminish the secretion of milk.

DOSE AND MODE OF ADMINISTRATION.—ʒj. to ʒiv. dissolved in warm water, or in powder combined with rhubarb.

Potassæ sulphas cum sulphure, E. (Nitrate of potash; and sulphur, equal parts; mix thoroughly, and project in small successive portions into a red-hot crucible; when the deflagration is over and the salt has cooled, reduce it to powder, and preserve in well-closed bottles.) A mild cathartic, much more soluble than the plain sulphate. Dose, ʒss. to ʒj.

INCOMPATIBLES.—Nitric, and hydrochloric acids; tartaric acid; chloride of calcium; chloride of barium; the acetate and diacetate of lead; nitrate of silver; corrosive sublimate; and sulphate of magnesia.

POTASSÆ TARTRAS, D. L. E. *Tartrate of Potash; Neutral Tartrate of Potash.*

PREPARATION.—An article of the Materia Medica in the London Pharmacopœia. "Take of carbonate of potash from pearl-ash, eight ounces; white bitartrate of potash, in fine powder, one pound, or a sufficient quantity; distilled water, half a gallon: Dissolve the carbonate of potash in the water, and to the solution, while boiling hot, gradually add the bitartrate, until the liquid, after the ebullition has been continued for a couple of minutes, ceases to change the colour of blue or reddened litmus. Filter through calico, and having evaporated the clear liquor until a pellicle forms on its surface, set it by to crystallize. After twelve hours pour off the liquid, and, having dried the crystals on bibulous paper, preserve them in a well-stopped bottle," D. "Bitartrate of potash in powder, ℔iij.; carbonate of potash, ℥xvj.; boiling water, Ovj.; dissolve the carbonate in the boiling water, then add the bitartrate till the liquor is neutralized and boil. Filter the liquor, and concentrate by boiling till a pellicle floats on the surface, and set it aside that crystals may be formed. The residual liquor will yield more crystals by farther crystallization and cooling," E.

PHYSICAL PROPERTIES.—A solid, white salt, crystalline, but generally met with in the form of a granular powder; the crystals are small right rhombic prisms. It is inodorous, and has a cooling saline taste. Specific gravity, 1·556.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of potash, and 1 of tartaric acid ($2\,KO, C^4H^2O^5$), and is therefore a bibasic-tartrate of potash; it attracts moisture in a damp atmosphere, but does not deliquesce; exposed to heat it is decomposed, and converted into a compound of carbonate of potash and charcoal. It is soluble in an equal weight of cold water, whence the name *soluble tartar* is applied to it; it is likewise soluble in alcohol.

ADULTERATIONS.—This salt is not unfrequently adulterated with the bitartrate, which may be known by its not being soluble in its own weight of water at 50°. It also sometimes contains carbonate or sulphate of potash or chloride of potassium; any of which may be detected "by the precipitates occasioned in it by chloride of barium or acetate of lead not being soluble in dilute nitric acid," *London Pharmacopœia.*

THERAPEUTICAL EFFECTS.—A mild but efficient purgative, not much employed in the present day. By accelerating the operation of the resinous purgatives, it corrects their griping properties.

DOSE AND MODE OF ADMINISTRATION.—ʒij. to ʒx. in solution.

INCOMPATIBLES.—All acids, and most acidulous salts; lime water; chloride of calcium; nitrate of silver; and acetate of lead.

PRUNA, D. E. PRUNUM, L. *Prunes. The dried fruit of Prunus domestica.* The plum tree, originally a native of Syria, is now cultivated extensively in the temperate regions of Europe, and in the British Isles; it belongs to the Natural family *Rosaceæ* (*Drupaceæ,* Lindley), and to the Linnæan class and order *Icosandria Monogynia.* The fruit dried in the sun constitutes *prunes;* they are imported principally from Bordeaux. Prunes are mildly laxative, and are sometimes added to infusion of senna to conceal its nauseous taste. They enter into the composition of the electuary of senna of the pharmacopœias.

For use in medicine, the London Pharmacopœia directs Prunes to be prepared as follows:—*Prunum præparatum,* "Prunes, ℔j.; water, sufficient to cover them; boil slowly for four hours. Express the pulp first through a coarse cane sieve, and then through a fine hair sieve. Finally evaporate in a water bath to the consistence of a confection."

RHAMNI BACCÆ, E. RHAMNI SUCCUS, L. *Buckthorn berries. Fruit of Rhamnus catharticus. Juice of the fruit of Rhamnus catharticus,* L. An indigenous shrub belonging to the Natural family *Rhamnaceæ,* and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Stems about ten feet high, branching, spiny; Leaves ovate, sharply serrated; Flowers, small, yellowish-green, diœcious; Fruit, a berry.

PHYSICAL PROPERTIES.—The berries are about the size of peas, black, shining, four-seeded, with a green juicy parenchyma; they have an acrid, nauseous taste, and when bruised, emit a faint unpleasant odour. The juice is preserved in the form of syrup.

CHEMICAL PROPERTIES.—The juice consists of a peculiar colouring matter, acetic acid, mucilage, sugar, and nitrogenous matter. A purgative principle exists in the berries which has been named *Cathartin;* it differs, however, from the cathartin of senna leaves, being more nearly allied to aloetin both in a chemical and therapeutical point of view; Trenkler has prepared it from the unripe green berries, by treating the inspissated juice with alcohol and ether,—℔xij. yield ℥viij. of impure cathartin. By evaporating to dryness the juice mixed with lime or with alum, the pigment, *sapgreen,* is obtained.

ADULTERATIONS.—The berries of the *Rhamnus frangula* are often substituted for, or mixed with buckthorn berries; they may be detected by having only *two* seeds.

THERAPEUTICAL EFFECTS.—The fresh berries or their expressed juice operate as a powerful cathartic, producing many watery evacuations; but in consequence of the severity of their operation frequently accompanied by severe tormina, thirst, and distressing nausea, although in former days much vaunted in the treatment of dropsy, they are at present scarcely ever used.

DOSE AND MODE OF ADMINISTRATION.—Of the fresh berries, 10 to 20. The dose of *Cathartin* is from gr. j. to gr. iij.

Syrupus Rhamni, L. E. ("Juice of the berries, Oiv.; ginger, sliced; and pimento, powdered, of each, ʒvj; sugar, ℔vj; rectified spirit, f℥vj.; let the juice rest for three days that the dregs may subside, and strain. Macerate for four hours with a gentle heat the pimento and ginger in Oj. of the strained juice, and filter; boil down the rest of the juice to Oiss., mix the liquors and melt the sugar in them; finally add the spirit," L. "Fresh juice of buckthorn berries, Oiv.; ginger, sliced; and pimento, bruised, of each, ʒvj.; pure sugar, ℔iv.; let the juice rest three days, pour off the clear liquor and strain it. Digest the pimento and ginger in Oj. of the strained liquor at a gentle heat for four hours and filter. Boil down the rest of the juice to Oiss., mix the two liquors, add the sugar, and dissolve it with heat," E.). Dose, f℥ss. to f℥j.

RHEUM, D. L. E. *Rhubarb. Root of an undetermined species of Rheum.* The exact species of the genus Rheum, from which the different varieties of Rhubarb met with in commerce are obtained, is as yet unknown. They inhabit the northern regions of Asia, from the shores of the Caspian Sea to the Chinese wall, and are cultivated in most of the countries of Europe. The genus is placed in the Natural family *Polygonaceæ*, and in the Linnæan class and order *Enneandria Monogynia*. The following species of Rheum have been referred to by different authorities as yielding rhubarb of one kind or another; viz.—*Rheum palmatum; R. australe; R. rhaponticum; R. compactum; R. emodi; R. webbianum; R. spiciforme; R. moorcroftianum; R. crassinervium; R. leucorrhizum; R. undulatum, &c.*

BOTANICAL CHARACTERS.—All the species are characterized by having a perennial root, which sends up annual root leaves, usually very large, deeply incised, and wavy at the edges, generally cordate; a herbaceous flowering stem, from two to four feet high; Flowers, small, calyx petaloid, six-parted, withering.

PREPARATION.—The root is dug up when the plant is five or six years old, washed, scraped, and cut into various sized pieces to facilitate the drying; the pieces are then pierced, strung upon cords, and dried differently in various localities: sometimes on stone tables heated beneath by a fire, sometimes in the sunshine, sometimes slowly under sheds by a current of air, while in Tartary the Moguls are said to hang them about their tents or on the horns of their sheep.

PHYSICAL PROPERTIES.—Three varieties of rhubarb are ordinarily met with in British trade, each of which shall be considered separately, viz.—Russian, Chinese or East Indian, and English Rhubarb. The two former are officinal in the London Pharmacopœia, both being included under the appellation *Rheum Sinense.*

1. RUSSIAN RHUBARB; *Turkey Rhubarb:* it is met with in irregular shaped pieces, from an inch to three inches in breadth, roundish, sometimes flattened on one side, angular, heavy, of a bright-yellow colour, without any traces of epidermis; generally perforated with conical, not cylindrical holes, in some pieces extending completely, in others only partially through their substance; internally compact, beautifully marbled with yellow, red, and white streaks or points. The odour is strong and peculiar; the taste is bitter and faintly astringent; chewed it feels gritty under the teeth, owing to the presence of crystals of the oxalate of lime, and tinges the saliva yellow; it may be readily pulverized; the powder is of a bright yellow colour. This description of rhubarb is collected by the Bucharians on the mountains of Tartary, brought by them to the Russian town of Kiachta for barter, whence it is conveyed to St. Petersburgh, where it is sorted, packed into boxes or cases which are covered on the outside with a hide, and then exported to the different countries of Europe and to the British Isles.

2. CHINESE, OR EAST INDIA RHUBARB, is met with in globular or flat pieces, rounded, not angular on the surface, of a brownish-yellow colour, usually presenting some traces of epidermis; somewhat heavier than Russian rhubarb; perforated with cylindrical holes, in many of which are found pieces of cord by which the roots were suspended while being dried; internally they are close and compact, marbled and spotted yellowish-brown and whitish; the odour is somewhat stronger than that of Russian rhubarb, the taste similar; the powder is not of so bright a colour. This description is the product of the northern provinces of China; it is imported in chests directly from Canton or by way of Singapore.

3. ENGLISH RHUBARB. Two kinds are commonly met with.—1st. *Stick Rhubarb;* which occurs in pieces about five or six inches long, and half an inch in diameter, round, striated, of a dirty-yellowish-brown colour externally, blackish internally with reddish streaks; its odour is faint, and its taste astringent, not gritty.—2nd. *Trimmed Rhubarb;* this sort is often sold for Turkey rhubarb, which it is prepared to represent; its texture, however, is in general soft and spongy, it has a pinkish hue, is mucilaginous, and is pulverized with difficulty; its taste is astringent, its odour faint, and it is not gritty under the teeth, containing but few crystals of oxalate of lime.

The following sorts of rhubarb are of such rare occurrence in the English market, that a mere mention of them will suffice:—*French rhubarb, Bucharian rhubarb, Siberian rhubarb, Canton-stick rhubarb,* and *Himalayan rhubarb.*

CHEMICAL PROPERTIES.—According to the extended analysis, of

Brandes in 1836, rhubarb consists of a peculiar principle, named by him *Rhabarberic acid (Rhein, Rheumin, Rhabarberin, Caphopicrite, Chrysophanic acid*, of other chemists), gallic and tannic acids, uncrystallizable sugar, starch, gummy extractive, colouring extractive, pectic acid, malate and gallate of lime, oxalate of lime, inorganic salts, silica, iron and woody fibre. More recently rhubarb has been carefully analysed by Schlozsberger and Doppig, and later still by Schroff of Vienna. The former chemists ascertained that the various so-called active principles above enumerated under different names were all compound, and contained *Chrysophanic acid* as their base; and they also isolated from the spirituous extract three different resins which they termed *Aporetine*, *Phaoretine*, and *Erythoretine*. Schroff's experiments were chiefly directed to ascertain in what peculiar principle the purgative property of the drug depended, but this he completely failed in doing, chrysophanic acid, rhein and rhabarberine being much less active as purgatives than the powder of rhubarb. It is hence manifest that the chemistry of this important medicine is still to be investigated. Rhubarb yields its active principles to both cold and boiling water, to proof spirit, to alcohol, and to ether.

ADULTERATIONS.—The inferior sorts, especially British rhubarb, are frequently mixed with, or substituted for, the finer kinds; the fraud may be detected by attending to the characters given above for the different varieties. Powdered Turkey or East India rhubarb is very generally adulterated with British rhubarb; the sophistication is difficult of detection, but the fresh powder of the finer sorts is always of a *bright* yellow colour.

THERAPEUTICAL EFFECTS.—Rhubarb acts upon the whole tract of the digestive canal as a mild tonic, cathartic, and astringent. In small doses, it manifests its tonic properties only, promoting the digestive process, as indicated by increased appetite and an improvement in the quality of the alvine secretions. In full doses, it operates as a mild cathartic, stimulating to increased activity the muscular coat of the whole of the intestinal canal, more especially that of the duodenum, but scarcely, if at all, augmenting the secretions. Its astringent property is manifested after the cathartic action has ceased, constipation usually following its purgative effects. The combination of these properties, as well as the safety and mildness of its operation, renders rhubarb a remedy of much value in many diseases. Thus in the treatment of the early stages of the *diarrhœa of irritation*, it is the most efficacious purgative we can employ; it is also peculiarly adapted as a cathartic for infancy and childhood, and as a general laxative for persons with enfeebled digestion, and in all cases of debility of the digestive organs. For the same reasons rhubarb is inadmissible in the treatment of febrile and inflammatory affections. Rhubarb is absorbed in the course of its operation, and its peculiar odour and yellow colouring matter may be recognised in the urine, in the sweat, in the serum of the blood, and in the milk of nurses, to the latter of which it imparts a purgative property.

DOSE AND MODE OF ADMINISTRATION.—In powder as a stomachic tonic, gr. v. to gr. x.; as a cathartic, ℈j. to ℈ij. A few drops of the essential oil of nutmegs rubbed up with powdered rhubarb mask its disagreeable odour.

Pulvis Rhei compositus, D. E. ("Take of rhubarb, in fine powder, two ounces; magnesia, six ounces; ginger, in fine powder, one ounce: Mix thoroughly by trituration, pass the powder through a fine sieve, and keep it in well-closed bottles," D. "Magnesia, ℔j.; ginger, in fine powder, ℥ij.; rhubarb, in fine powder, ℥iv.; mix thoroughly, and preserve in well-closed bottles," E.). A useful antacid purgative, commonly known as *Gregory's Powder;* Dose, for children, gr. v. to gr. xij.; for adults, ʒss. to ʒj.

Extractum Rhei, D. L .E. ("Rhubarb, in thin slices, ℔j.; water, Ov.; macerate the rhubarb for twenty-four hours in Oiij. of the water; filter the liquor through a cloth, and express; macerate the residuum with the rest of the water for twelve hours, filter through the cloth previously used and express the residuum strongly. The liquors, filtered again if necessary, are to be mixed and evaporated to a proper consistence in a water bath," D. "Rhubarb, powdered, ℥xv.; proof spirit, Oj.; distilled water, Ovij.; macerate for four days, filter, and allow the dregs to subside; pour off the clear liquor, and evaporate when clear to a proper consistence," L. "Rhubarb, ℔j.; water, Ov.; cut the rhubarb into small fragments; macerate it for twenty-four hours, in Oiij. of the water; filter the liquor through a cloth and express it with the hands or otherwise moderately; macerate the residuum with the rest of the water for twelve hours at least, filter the liquor with the same cloth as before and express the residuum strongly The liquors, again filtered if necessary, are then to be evaporated together to a proper consistence in the vapour bath. The extract, however, is obtained of finer quality by evaporation in a vacuum with a gentle heat," E.). Dose, gr. x. to ʒss.

Pilulæ Rhei, E. (Rhubarb, in fine powder, 9 parts; acetate of potash, 1 part; conserve of red roses, 5 parts; beat into a proper mass.) Dose, gr. v. to gr. xv.

Pilulæ Rhei compositæ, D. L. E. ("Take of rhubarb, in fine powder, one ounce and a-half; hepatic aloes, in fine powder, nine drachms; myrrh, in fine powder; Castile soap, of each, six drachms; oil of peppermint, one fluid drachm; treacle, *by weight*, two ounces: reduce the soap to a fine powder, and triturate it with the rhubarb, aloes, and myrrh; then add the treacle and oil of peppermint, and beat the whole into a uniform mass." D. "Rhubarb, powdered, ʒiv.; socotrine aloes, powdered, ʒiij.; myrrh, powdered, ʒij.; soft soap, ʒss.; oil of caraway, min. xv.; treacle, a sufficiency; mix the powders together, then having added the other ingredients beat all into a mass," L. "Rhubarb, in fine powder, 12 parts; aloes, in fine powder, 9 parts; myrrh, 6 parts; Castile soap, 6 parts; oil of peppermint, 1 part; conserve of red roses, 5 parts; mix and beat to a proper mass, and divide into five-grain pills. This pill may be also made without oil of peppermint, when so preferred," E.) One of the most valuable pill masses; mildly tonic and purgative; Dose, gr. v. to ℈j. As prepared according to the processes contained in the three British Pharmacopœias, although the ingredients differ slightly, the strength of the pill mass is the same.

Pilulæ Rhei et Ferri, E. (Dried sulphate of iron, 4 parts; extract of rhubarb, 10 parts; conserve of red roses, 5 parts; beat them into a proper mass and divide it into five-grain pills.) Tonic and laxative, useful in chlorosis; Dose, gr. x. to gr. xv.

Infusum Rhei, D. L. E. ("Rhubarb root in thin slices, ʒij.; boiling water, f℥ix; infuse for one hour in a covered vessel and strain, the product should measure about f℥viij.," D. "Rhubarb, sliced, ʒiij.; boiling distilled water, Oj.; macerate for two hours in a covered vessel and strain," L. "Rhubarb, in coarse powder, ℥j.; spirit of cinnamon, fʒij.; boiling water, f℥xviij.; infuse the rhubarb for twelve hours in the water in a covered vessel, add the spirit and strain through linen or calico," E.) Stomachic and very mildy laxative, a useful vehicle for more active purgatives. Dose, f℥ss. to f℥ij. The London infusion is somewhat weaker than that of either of the other colleges.

Tinctura Rhei, E. (Rhubarb, in moderately fine powder, ℥iiiss.; cardamom seeds, bruised, ℥ss.; proof spirit, Oij.; mix the rhubarb and cardamoms, and proceed by the process of percolation as directed for tincture of cinchona; or it may be prepared by digestion.) A cordial purgative employed as an addition to cathartic mixtures in doses of fʒj. to fʒiij.—*Tinctura Rhei composita*, D. L. ("Rhubarb root, bruised, ℥iij.; cardamom seeds, bruised, ℥j.; liquorice root, bruised, ℥ss.; saffron, chopped fine, ʒij.; proof spirit, Oij.; macerate for fourteen days, strain, express, and filter," D. Rhubarb, sliced, ℥iiss.; fresh liquorice root bruised, ʒvj.; ginger, bruised; saffron, of each, ʒiij.; proof spirit, Oij.; macerate for seven days, express and filter," L.) Uses and dose same as last preparation.

Tinctura Rhei et Aloes, E. (Rhubarb, in moderately fine powder, ℥iss.; Socotrine or East Indian aloes, in moderately fine powder, ʒvj.; cardamom seeds, bruised, ʒv.; proof spirit, Oij.; mix the powders and proceed as for tincture of cinchona.) A cordial purgative. Dose, f℥ss. to f℥j.

Vinum Rhei, D. E. ("Take of rhubarb in coarse powder, three ounces; canella, in coarse powder, two drachms; sherry wine, two pints: macerate for fourteen days, with occasional agitation; then strain with expression, and filter," D. "Rhubarb, in coarse powder, ℥v.; canella, in coarse powder, ʒij.; proof spirit, f℥v.; sherry, Oj. f℥xv.; digest for seven days, strain, express strongly, and filter," E.) Stomachic and purgative. Dose, fʒij. to f℥j.

Syrupus Rhei, (Rhubarb, 9 parts; cold water, 50 parts; macerate for twelve hours, strain with expression, filter, and dissolve in the liquor twice its weight of sugar.) Dose, fʒss. to fʒj.

INCOMPATIBLES.—*With the infusion.*—Ammonia; carbonate of potash ; lime water ; the mineral acids ; acetate of lead ; tartar emetic ; corrosive sublimate ; the sesquisalts of iron ; and astringent vegetable infusions or decoctions.

RICINI OLEUM, D. L. E. *Castor oil ; Oil expressed (either by heat or pressure,* L.*) from the seeds of Ricinus communis.* The castor oil tree is a native of Africa and the East Indies ; it is cultivated at present very extensively in the West Indies, and in North and South America ; it also grows in the South of Europe and in the British Isles. It belongs to the Natural family *Euphorbiaceæ,* and to the Linnæan class and order *Monœcia Monadelphia.*

BOTANICAL CHARACTERS.—In northern countries, a herbaceous annual, seldom exceeding 3 or 4 feet in height, in warm climates it becomes an arborescent perennial, attaining a height of 20 to 30 feet; Leaves, large, of a dull green colour, shining, palmate, deeply cut into acute lobes, serrated ; Flowers, in terminal panicles, glaucous-green, monœcious ; Fruit, a three-celled capsule covered with spines, each cell containing one seed ; the seeds are oval, about three lines broad, four lines long, and a line and a half thick ; the seed-coat is pale-grey, marbled with blackish and yellowish-brown spots and stripes ; it encloses a thick, fleshy, oily nucleus, within which is a large, dicotyledonous leafy embryo.

PREPARATION.—The fixed oil of the seeds, which alone is officinal, is obtained by expression with or without the aid of heat, the seed coats being usually first removed ; that obtained without heat is called *cold drawn castor oil,* and bears the highest character. This is the process followed in the West Indies, and for the finer qualities of oil in the East ; more generally, however, in the East Indies, the seeds are boiled in water, dried and bruised, and again boiled in water till the oil separates and floats on the surface. In North America, the seeds are heated and pressed, and the oil thus obtained is boiled with water to free it from impurities. The seeds yield about 30 per cent. of oil.

PHYSICAL PROPERTIES.—Castor oil is a viscid oily liquid, of a very pale straw colour (inferior sorts are deep yellow), having a faint, slightly nauseous odour, and a mild greasy taste. Specific gravity, 0·964.

CHEMICAL PROPERTIES.—According to the analysis of Bussy and Lecanu, it is a compound of, or rather is converted by distillation into, three fatty acids, *ricinic, elaiodic,* and *margaritic ;* but the source of its laxative properties has not been as yet discovered. Its ultimate constituents according to Ure, are 74 per cent. of carbon, 10·29 of hydrogen, and 15·71 of oxygen. Exposed to a cold a little below 32°, it becomes thick and turbid, at 0° congeals into a transparent yellow mass, by exposure to the air thickens and dries without becoming opaque, and hence is called a *drying oil,* and is decomposed by a heat above 500°. Castor oil is soluble in ether and in cold alcohol ; the latter property is not possessed by any other fixed oil with which we are acquainted except concrete palm oil, and, according to Pereira, British expressed croton oil (See page 113.) East Indian castor oil is the kind principally employed at present in the British Isles ; West Indian castor oil is not imported ; and American castor oil is but little esteemed by druggists—although equally efficacious as a medicine and free from any unpleasant flavour—in consequence of its becoming turbid in cold weather and throwing down a copious deposit of white fatty crystals.

ADULTERATIONS.—The adulteration of castor oil with other fixed oils, a fraud more frequently practised in former days than at present, may be readily detected by its solubility in alcohol; pure castor oil being entirely dissolved by its own volume of alcohol. It should also be free from any rancid odour, or acrid taste.

THERAPEUTICAL EFFECTS.—Castor oil is a mild but effectual cathartic, operating soon after it has been taken without pain or uneasiness, producing three or four thin, feculent, not watery evacuations ; these properties adapt it for all cases in which we desire to evacuate the contents of the intestinal canal, without producing abdominal irritation or general disturbance of the system. The only objection to its employment is its disagreeable greasy taste, in consequence of which it frequently occasions nausea and vomiting. The following are a few of the cases in which its use as a cathartic is particularly indicated : inflammatory or spasmodic diseases of the intestinal canal or of the urino-genital apparatus ; hemorrhoidal affections ; stricture of the rectum ; during pregnancy and after delivery ; in diseases of infancy and childhood; after surgical operations about the pelvis or abdomen, &c. If castor oil be at all rancid it becomes very acrimonious, causing much irritation, and sometimes even troublesome diarrhœa.

DOSE AND MODE OF ADMINISTRATION.—f℥ss to f℥ij., by the mouth or in the form of enema ; it is best taken floating on the surface of water to which some aromatic tincture, as of cascarilla or of orange peel, has been added ; or it may be made into an emulsion with yolk of egg or with mucilage and flavoured with syrup of orange peel. M. Parola has proposed the substitution of an ethereal or alcoholic tincture of castor oil seeds for the oil itself. He states as the result of numerous trials he has made, that the tinctures are four times as strong as the oil, than which they are less irritant and less apt to produce vomiting. The tinctures (for which M. Parola does not give any formulæ) may be readily prepared by macerating ℥viij. of the fresh seeds, freed from the seed-coats and bruised, in Oj. of rectified spirit or of ether for seven days and filtering : the dose of either would be from fʒij. to fʒiij. But from some experiments which I made with these tinctures, their action appears to be very uncertain.

Castor oil purgative emulsion, (Castor oil, f℥j. ; yolk of egg. 1 ; peppermint water, f℥ss. ; water, fʒij. ; syrup of orange peel, f℥j. ; mix.) Sufficient for one dose.

Castor oil draught, RIGHINI. (Gum arabic, in fine powder, ʒij. ; pure water, f℥iij. ; make a mucilage with a small quantity of the water ; and add, of castor oil, f℥j. ; mix carefully and pour in the the rest of the water with constant agitation ; and finally add the filtered juice of one orange and f℥j. of simple syrup.) The nauseous taste of the oil is completely concealed in this draught, the only objection to which is its bulk.

SCAMMONIUM, D. L. E. *Scammony. The gum-resinous exudation from the incised root of Convolvulus scammonia.* A native of Greece, and various part of the Levant, where it is found growing in hedges and bushy places. It is placed in the Natural family *Convolvulaceæ,* and in the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Root, very thick, fusiform, fleshy, abounding in a milky juice; Stems, smooth, herbaceous, climbing; Leaves, pointed, hastate; Flowers, on long, solitary peduncles, yellowish, with purple stripes.

PREPARATION.—The inspissated juice of the root, which constitutes scammony, is procured as follows:—The earth having been cleared away, the top of the root is sliced off obliquely with a sickle-shaped knife from an inch to an inch and a-half below where the stems spring from it; as the juice flows out, it is received in mussel shells and exposed to the air until it thickens; the best roots although generally four feet in length, and three or four inches in diameter, yield only about two drachms of scammony.

PHYSICAL PROPERTIES.—Fine scammony, *Virgin scammony,* is in amorphous masses, weighing from two ounces to half a pound each, very porous, friable, and of an ash-grey colour externally; its fracture is conchoidal, very resinous, porous, and of a dark greenish-black colour; the odour is strong, peculiar, resembling somewhat that of old cheese, heightened by being breathed on, and the taste is acrid and nauseous; specific gravity, 1·210. This variety of scammony is scarce, and when met with bears a very high price. Scammony as it commonly occurs is an impure article, usually imported in boxes or drums, seldom in cakes; it is heavier than virgin scammony, more compact, and of a pale ash-grey colour; its fracture is earthy, dull, not porous, and of a greyish-black colour; in some specimens presenting numerous white specks (chalk); its odour and taste are the same as of pure scammony; specific gravity, from 1·276 to 1·543.

CHEMICAL PROPERTIES.—According to Christison's analysis, fine specimens of virgin scammony consist of 81 to 83 per cent. of resin, 6 to 8 per cent. of gum, and some woody fibre, sand, moisture, and sometimes a trace of starch. In the best specimens which I have had an opportunity of examining, I have found but 76 per cent. of resin. The *resin* is the active principle of the drug; it may be readily obtained by treating scammony with sulphuric ether and evaporating to dryness, or by the process of the Edinburgh Pharmacopœia, given below; in mass it is of a reddish-yellow colour, shining and semitransparent, its powder is pale straw colour; it is void of odour and taste when quite pure. It is soluble in alcohol, ether, and oil of turpentine, and forms with unskimmed milk a fine uniform emulsion. By the latter characteristic and also by its solubility in oil of turpentine it is distinguished from resin of jalap.

ADULTERATIONS.—No drug is more generally and more uniformly adulterated than scammony ; it is indeed very difficult to meet with it in a perfectly pure state. And to so great an extent is the adulteration practised, that in many specimens which I have examined I have frequently found not more than from 28 to 35 per cent. of resin present. The substances used to adulterate the drug are chalk and flour either separately or conjointly, guaiacum resin and gum tragacanth. Chalk and flour may be readily detected ; the former, by the effervescence produced when hydrochloric acid is dropped on a small fragment; the latter by a cooled and filtered decoction of the powder being rendered blue by tincture of iodine. The adulteration with guaiacum resin has been practised only within the last few years, but I have met with it in many samples. Its presence may be discovered by pouring a few drops of an alcoholic tincture of scammony on the fresh-cut surface of a raw potato, when if guaiacum be present, a blue colour will be produced : or by exposing paper moistened with the tincture to nitrous acid fumes (obtained by pouring a little nitric acid over some slips of copper), which will be rendered blue if this fraud has been practised. I have never found tragacanth in scammony, but this sophistication is stated to have been detected in one instance. It may be discovered by first separating the resin with sulphuric ether, and then treating the residue with cold water, when if any gum tragacanth be present a thick mucilage will be formed.

THERAPEUTICAL EFFECTS.—Scammony, when pure, is a powerful cathartic, operating as a direct irritant to the intestinal mucous membrane, and producing copious watery evacuations. It is well adapted for cases of habitual constipation arising from a torpid state of the intestinal canal, in passive dropsies, in apoplectic affections, and as an active purgative for children, for whom it is beneficially combined with calomel. If there be any tendency to inflammation of the digestive organs, scammony is contraindicated as a cathartic. From the difficulty of procuring the drug in a pure state, scammony has of late years fallen into much disrepute.

DOSE AND MODE OF ADMINISTRATION.—In powder, if the scammony be pure, for an adult, gr. viij. to gr. x., but as usually met with, double that quantity ; it should be prescribed in combination with some bland powder, or made into an emulsion with milk.

Pulvis Scammonii compositus, D. L. ("Take of scammony, in fine powder, one ounce ; compound powder of jalap, three ounces. Mix thoroughly by trituration, and pass the powder through a fine sieve," D. "Scammony ; hard extract of jalap, of each, ℥ij. ; ginger, ʒss. ; rub separately to very fine powder, and mix," L.). Dose, for an adult, gr. x. to gr. xx. ; for a child, gr. iij. to gr. v.

Extractum, sive, Resina Scammonii, E. (Take any convenient quantity of scammony in fine powder, boil it in successive portions of proof spirit, till the spirit ceases to dissolve anything, filter, distil the liquid till little but water passes over, then pour away the watery solution from the resin at the bottom, agitate the resin with successive portions of boiling water till it is well washed, and, lastly, dry it at a temperature not above 240°.) The resin of scammony is a most valuable preparation, and especially adapted for children in consequence of the tasteless form in which it may be administered. Dose, gr. ij. to gr. v.; best administered according to the following formula.

Mistura Scammonii, E. (Resin of scammony, gr. vij.; unskimmed milk, f℥iij.; triturate the resin with a little of the milk, and gradually with the rest of it till a uniform emulsion be obtained.) Intended for one dose for an adult, but much too powerful; I have always found gr. v. triturated with the same quantity of milk sufficient for the most obstinate bowels. This mixture cannot be distinguished either by smell or taste, from rich new milk, and consequently forms a very convenient purgative for children in doses of f℥ss. to f℥iss.

Confectio Scammonii, D. L. ("Take of scammony, in fine powder, three ounces; ginger, in fine powder, one ounce and a-half; oil of caraway, one fluid drachm; oil of cloves, half a fluid drachm; simple syrup, three fluid ounces; clarified honey, *by weight*, one ounce and a-half: beat the powders with the syrup and honey into a uniform mass, then add the oils, and mix all well together," D. "Scammony, ℥iss.; cloves, bruised; ginger, powdered; of each, ʒvj.; oil of caraway, fʒss.; syrup of roses, a sufficiency; rub the dry ingredients together to very fine powder, and preserve them in a covered vessel; then, whenever the confection is to be used, the syrup being gradually poured in, rub again; lastly, the oil of caraway being added, mix them all," L.). A stimulating cathartic, but seldom used, yet it forms a good addition to purgative draughts containing the neutral salts. Dose, for an adult, ʒss. to ʒj.; for children, gr. v. to gr. xij.

Scammony biscuits, (Scammony resin, in fine powder, ʒj.; castile soap, gr. v.; white sugar, ℈ij.; reduce to a fine powder and mix intimately with ℥j. of powdered biscuit; make into a stiff paste with a few drops of water; divide into portions of ʒj. each, and dry in the air.) Each drachm contains gr. vj. of scammony resin.

INCOMPATIBLES.—All acids.

SENNA ALEXANDRINA, D. L. E. *Leaves of Cassia acutifolia*, D. *Leaf of Cassia officinalis? (Senna officinalis*, Roxb.) *and Cassia obovata*, L. *Leaves of various species of Cassia, probably of Cassia lanceolata, of Cassia acutifolia, and of Cassia obovata; Alexandrian senna; as imported it also contains an abundant admixture of leaves of Cynanchum argel, which ought to be removed as far as possible by picking*, E.

SENNA INDICA, L. E. TINNIVELLY SENNA, D. *Leaves of Cassia elongata*, D. E. *East India Senna, var. Tinnivelly*, E. *Leaf of Cassia officinalis, (Senna officinalis*, Roxb.), L.

A certain amount of confusion still exists as to the species of the genus cassia which yield the senna leaves of commerce. They are inhabitants of the North of Africa, particularly Egypt, of Arabia, and of the Indian peninsula, where probably the plant has been introduced, and is now naturalized; it is also cultivated in the South of Europe, and in some of the West Indian Islands. The genus belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley,) and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—Shrubs or herbs, frequently annual; Leaves simply and abruptly pinnate; petioles, frequently glanduliferous; Leaflets opposite; Sepals, five, more or less unequal; Petals, five, unequal; Stamens, ten, free, unequal; Ovary, stalked, frequently arched; Legumes, various.

PREPARATION.—Senna leaves are gathered by the Arab tribes in Ethiopia, Arabia Felix, Abyssinia, Nubia and Sennaar, where the shrub is chiefly indigenous. The harvest begins about the end of September; the branches are cut off the trees and exposed to the sun until the leaves begin to fade, when they are placed on high ground and on rocks, so as to be dried as quickly as possible. When quite dry, the branches are laid in heaps and beaten with sticks until the leaves fall off. The method followed in India for the preparation of senna is similar to that used in Egypt.

PHYSICAL PROPERTIES.—Three sorts of senna are commonly known in the English market, Alexandrian senna, Tripoli senna, and East Indian senna. 1st.—ALEXANDRIAN SENNA, the produce of Nubia and Upper Egypt, is imported in large bales and barrels from Alexandria; it consists of grayish-green leaflets usually much broken, mixed with the flowers and fruits of the various species from which it is obtained; containing also a large quantity, generally about a tenth of the weight, of the leaves, flowers, and fruit of the *Cynanchum argel;* and sometimes a considerable number of pods, with a few leaves of the *Tephrosia apollinea.* The odour of Alexandrian senna is heavy and disagreeable, yet resembles in some respects that of tea; the taste is viscid and nauseous. 2nd.—TRIPOLI SENNA; it scarcely differs from that just described, for which it is indiscriminately sold; the leaflets are perhaps more broken down, smaller, and of a greener colour, it seldom contains either Cynanchum or Tephrosia leaflets. 3rd.—EAST INDIAN SENNA, *Tinnivelly senna;* this occurs in large unbroken leaflets, from one to two inches long, and half an inch broad, thin and flexible, and of a fine green colour; the leaflets, however, in some specimens acquire a black tinge or yellowish colour on exposure to the air, which probably arises from imperfect drying; both odour and taste are similar to, but a little weaker than Alexandrian senna.

CHEMICAL PROPERTIES.—According to MM. Lassaigne and Feneulle, Alexandrian senna is composed of *cathartin*, chlorophylle, yellow colouring matter, mucus, albumen, malic acid, and some salts. *Cathartin*, supposed to be the purgative principle, is an uncrystallizable, deliquescent substance, with a peculiar odour and a bitter nauseous taste; it is soluble in water and in alcohol, but insoluble in ether. The experiments of Christison on this substance prepared by himself, would appear to show that it is nearly if not altogether inert, and, therefore, cannot be the active principle of senna. Senna leaves yield their active properties to both cold and warm water, to proof spirit and to alcohol; warm water extracts about a third of the weight of the leaves.

ADULTERATIONS.—In Egyptian senna, as met with in British commerce, the only adulteration that is practised has been before indicated, namely, with Argel, and sometimes with Tephrosia leaflets. The former are readily distinguished by their paler yellowish colour, their coriaceous texture, their under surface being reticulated with veins, their upper surface somewhat rugose, and by their being equal-sided; the leaflets of all the true sennas being unequal at the base. Tephrosia leaflets are easily known by their silky surface, and by the lateral veins proceeding parallel to each other to the very edge of the leaf without ramifying. Two other adulterations are common on the continent, but have never been met with, as far as I am aware, in the British market; one is with the leaflets of the *Colutea arborescens* or bladder senna, which may be at once distinguished by their regularity at the base: the other, perhaps a more serious fraud in consequence of the supposed poisonous property of the substance employed, is with the leaflets of the *Coriaria myrtifolia;* they are known by presenting three very prominent longitudinal nerves, and chemically by their infusion producing with solution of sulphate of iron, a blackish precipitate *(tannate of iron)*, and with gelatin a heavy whitish precipitate *(tannate of gelatin)*. Senna adulterated with the leaves of the *Vaccinium vitis-idæa*, containing so much as 75 per cent. of them, has been offered for sale in the French market; the fraud is one easily detected by the character of the leaves, particularly by the reticulated surface and the equality at the base of the latter. The following are the characteristics of Alexandrian and Indian Senna given in the London Pharmacopœia:—*Alexandrian Senna,* "Leaf unequal at the base, ovato-acute or obovato-mucronate;" *Indian Senna,* "Leaf unequal at the base, lanceolate."

THERAPEUTICAL EFFECTS.—Senna is an active cathartic, holding a middle place between the milder and more active medicines of this class, operating effectually, yet safely, though often producing nausea, griping and flatulence. Its action is somewhat stimulating, increasing the secretions, and exciting the peristaltic action chiefly, but not alone, of the small intestines. Senna is adapted for all cases requiring an effectual purgative; but it should be combined with the active saline cathartics, for which the infusion is a good vehicle, if it be wished to diminish arterial action or produce general antiphlogistic effects. The only circumstance contra-indicating its employment is an inflammatory condition of the mucous membrane of the alimentary canal. The cathartic principle of senna is absorbed before its operation is produced, as is proved by the action on the intestines when an infusion is injected into the veins, and also by its imparting a purgative property to the milk of nurses.

DOSE AND MODE OF ADMINISTRATION.—Senna is not administered in the form of powder. ʒij. to ℥ss. infused in f℥ij. of boiling water for half an hour and the clear infusion poured off, will be sufficient for a dose ; its taste is much concealed by the addition to the infusion of some black tea, or what I have found still better, coffee, and it may be sweetened with sugar, and milk added ; it is in this way readily taken by children.

Infusum Sennæ compositum, D. L. *Infusum Sennæ*, E. ("Senna leaves, ℥ss. ; ginger root, sliced, ʒss. ; boiling water, Oss. ; infuse for one hour in a covered vessel and strain ; the product should measure about f℥viij.," D. "Senna, ʒxv. ; ginger, bruised, ℈iv. ; boiling distilled water, Oj. ; macerate for an hour in a covered vessel and strain," L. "Senna, ℥iss. ; ginger, bruised, ℈iv. ; boiling water, Oj. ; infuse for an hour in a covered vessel and strain," E.) Dose, f℥ij. to f℥iv. The common cathartic mixture, *Black Draught*, of hospitals, is prepared by adding ℥j. of sulphate of magnesia to f℥iv. of this infusion.

Infusum Sennæ compositum, E. (Senna, ʒj. ; tamarinds, ℥j. ; coriander, bruised, ʒj. ; muscovado, ℥ss. ; boiling water, f℥viij. ; infuse for four hours in a covered vessel, not glazed with lead, and then strain through linen or calico ; it may be made with twice or thrice the senna prescribed.) An excellent cathartic infusion. Dose, f℥ij. to f℥iv.

Syrupus Sennæ, L. E. ("Senna, ℥iiiss. ; fennel, bruised, ʒx. ; manna, ℥iij. ; boiling distilled water, Oj. ; treacle, ℔iij. ; macerate the senna and the fennel in the water with a gentle heat for six hours ; express the liquor strongly through linen, and filter ; then add the manna. Evaporate the treacle in a water bath, until a small quantity removed from the water bath solidifies, then add the liquor to it while still warm, constantly stirring until the entire is mixed," L. "Senna, ℥iv. ; boiling water, f℥xxiv. ; treacle, ℥xlviij. ; infuse the senna in the water for twelve hours, strain and express strongly ; concentrate the treacle in a vapour bath as far as possible, or till a little taken out on a rod becomes nearly concrete on cooling, and while the treacle is still hot add the infusion ; stirring carefully, and removing the vessel from the vapour bath as soon as the mixture is complete. If Alexandrian senna be used for this preparation, it must be carefully freed of Cynanchum leaves," E.) An agreeable cathartic for children, in doses of from fʒj. to f℥iv., or as an addition to cathartic mixtures for adults, in doses of f℥ss. to f℥j.

Confectio Sennæ, D. L. *Electarium Sennæ*, E. ("Take of senna, in fine powder, ℥ij.; coriander, in fine powder, ℥j. ; oil of caraway, fʒss. ; pulp of prunes, ℥v. ; pulp of tamarinds, ℥ij. ; brown sugar, ℥viij. ; water, f℥ij. ; dissolve the sugar in the water and beat the pulps with the syrup to a uniform consistence ; having stirred in the powders and oil of caraway, mix all well together, and heat the mass thoroughly in a water bath for ten minutes," D. "Senna, ℥viij. ; figs, ℔j. ; prepared tamarind pulp ; prepared cassia pulp ; prepared prunes, of each, ℔ss. ; coriander, ℥iv. ; fresh liquorice root, bruised, ℥iij. ; sugar, ℔iiss., distilled water, Oiij. ; powder together the senna and the coriander, and sift out ℥x.; boil the figs and the liquorice in the water to half; express and strain; evaporate the filtered liquor in a water-bath down to f℥xxiv.; form a syrup by adding the sugar; add the syrup to the tamarinds, cassia and prunes, throw in the sifted powder, and stir diligently with a spatula until a uniform compound shall be formed," L. "Senna, ℥viij.; coriander, ℥iv.; liquorice-root, bruised, ℥iij.; figs, ℔j.; pulp of prunes, ℔ss.; white sugar, ℔iiss.; water, Oiij.; powder the senna and coriander, sift out ℥x. of the mixture; boil the residue with the figs and liquorice in the water down to one half; squeeze and strain the liquor and evaporate it down to f℥xxiv.; dissolve in this the sugar, and add the syrup to the prunes, mix gradually the powder and triturate the whole carefully into an uniform mass," E.) Commonly known as *lenitive electuary*, a mild but efficacious compound in doses of ʒij. to ℥ss.; generally badly prepared, and very liable to adulteration, the true preparation being both troublesome and expensive.

Tinctura Sennæ composita, D. L. E. ("Senna, ℥iv.; caraway seeds, bruised; cardamom seeds, bruised, of each, ℥ss.; proof spirit, Oij.; macerate for 14 days, strain, express and filter," D. "Senna, ℥iiiss.; caraway, bruised, ʒiiiss.; cardamom, bruised, ʒj.; raisins, stoned, ℥v.; proof spirit, Oij.: macerate for 7 days, express and filter," L. "Sugar, ℥iiss.; coriander, bruised, ℥j.; jalap, in moderately fine powder, ʒvj.; caraway, bruised; and cardamom seeds, bruised, of each, ʒv.; raisins, bruised; and senna, of each, ℥iv.; proof spirit, Oij.; digest for seven days, strain, express and filter; may be more conveniently and expeditiously made by percolation, as directed for compound tincture of cardamoms; if Alexandrian senna be used, it must be freed from Cynanchum leaves by picking," E.) A stimulating and cordial cathartic, in doses of f℥ss. to f℥j., only fit for cold leucophlegmatic habits; more generally prescribed as an adjunct to infusion of senna, or other cathartic mixtures, in doses of fʒj. or fʒij. to correct their griping qualities.

Fluid extract of Senna, DUNCAN. (Tinnivelly senna, ℔xv.; exhaust with boiling water by displacement,—about four times its weight of water is sufficient; concentrate the infusion *in vacuo* to ℔x.; dissolve in the product ℔vj. of treacle previously concentrated over the vapour-bath, till a little of it becomes nearly dry on cooling; add of rectified spirit, (Dens. ·835.), f℥xxiv. and if necessary add water (f℥xvj.) to make Oxv.) Every fluid ounce of this extract corresponds to one *avoirdupois* ounce of senna: the dose is fʒij. for an adult. This is an excellent preparation, operating effectually, and seldom causing griping or any other annoyance. Alexandrian senna may be used instead of Tinnivelly, the Cynanchum leaves having been previously removed by picking.

INCOMPATIBLES.—The mineral acids; lime water; acetate of lead; tartar emetic; corrosive sublimate; and nitrate of silver.

SODÆ HYPOSULPHIS.—*Hyposulphite of soda; Sulphuretted sulphite of soda.*

PREPARATION.—Take of carbonate of soda, dried and powdered, 500 parts; sublimed sulphur, 100 parts; mix, and heat in a glass or porcelain capsule until the mass is completely fused, stirring constantly so as to expose every part of it to the contact of the air. When cold, dissolve in water, filter, and having added more sulphur, boil for a few moments. Filter again and evaporate with a gentle heat so as to obtain crystals. WALCHNER.

PHYSICAL PROPERTIES.—Hyposulphite of soda occurs in beautiful, rectangular flattened prisms, transparent, inodorous, with a bitter, saline, somewhat hepatic taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, one of hyposulphurous acid, and five of water, $(\mathrm{Na\,O}, \mathrm{S^2\,O^2} + 5\,\mathrm{HO})$ It is soluble in less than its weight of cold water; but is insoluble in alcohol. Sulphuric acid added to a solution of hyposulphite of soda, disengages sulphurous acid gas and precipitates sulphur.

THERAPEUTICAL EFFECTS.—This salt produces effects very nearly similar to those of sulphate of soda, acting as an active cathartic when given in a sufficient dose. In France it is generally preferred to the other neutral salts as a purgative in cutaneous affections.

DOSE AND MODE OF ADMINISTRATION.—From ʒj. to ʒij. dissolved in water, to which some aromatic tincture is added.

INCOMPATIBLES.—The mineral acids, and most salts.

SODÆ PHOSPHAS, D. L. E. *Phosphate of Soda.*

PREPARATION.—Phosphate of soda is an article of the Materia Medica in the London Pharmacopœia. The processes of the Dublin and Edinburgh Colleges are as follows:—"Take of ox-bones, burned to whiteness in a clear fire, ten pounds; oil of vitriol of commerce, fifty-six fluid ounces; distilled water, four gallons and a-half, or a sufficient quantity; crystallized carbonate of soda of commerce, twelve pounds, or a sufficient quantity: on the bone-earth, reduced to a fine powder, and placed in a large dish of earthenware or lead, pour the oil of vitriol, and mix well with a glass or porcelain rod, so that every particle of the powder may be moistened by the acid. After the lapse of twenty-four hours, add gradually, and with constant stirring, one gallon of distilled water, and digest for forty-eight hours, pouring on occasionally a little water, so as to restore what has been lost by evaporation. Add now a second gallon of the water, and, having well agitated the mixture, and continued the digestion for another hour, let the whole be thrown upon a calico filter; and, when the liquid has ceased to trickle through, let the precipitate be repeatedly washed with boiling distilled water, until the washings, allowed to drop on blue litmus paper, redden it only in a very slight degree. Concentrate the filtered solution and washings to the bulk of one gallon, and, having set it by for twenty-four hours, pass it through a filter. To the filtered solution, raised to the temperature of 212°, gradually add the carbonate of soda previously dissolved in two gallons of boiling water, until the mixture acquires a slight alkaline reaction, and then place the whole upon a calico filter. The clear solution which passes through, when concentrated until a film begins to form on its surface, will, upon cooling, afford crystals of phosphate of soda; and from the mother liquor an additional product may be obtained by further concentration. The salt, when dried on blotting-paper, should be preserved in a well-stopped bottle," D. "Take of bones burned to whiteness, ℔x.; sulphuric acid, Oij. f℥iv.; carbonate of soda, a sufficiency; pulverize the bones and mix them with the acid, add gradually Ovj. of water; digest for three days, replacing the water which evaporates; add Ovj. of boiling water, and strain through strong linen; pass more boiling water through the mass on the filter till it comes away nearly tasteless; let the impurities subside in the united liquors; pour off the clear fluid and concentrate to Ovj.; let the impurities again settle, and to the clear liquor which is to be poured off and heated to ebullition, add carbonate of soda previously dissolved in boiling water until the acid be completely neutralized; set the solution aside to cool and crystallize. More crystals will be obtained by successively evaporating, adding a little carbonate of soda till the liquid exerts a feeble alkaline reaction on litmus paper, and then allowing it to cool," E.

PHYSICAL PROPERTIES.—Transparent, colourless crystals, the form of which is the oblique rhombic prism; inodorous, with a cooling, saline, not unpleasant taste. Specific gravity, 1·333.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of soda, 1 of phosphoric acid, 1 of basic water, and 24 of water of crystallization, $(HO, 2NaO, P^{2}O^{5} + 24\ HO)$; it effloresces and becomes opaque by exposure to the air; moderately heated it fuses in its water of crystallization, which if the heat be increased is driven off. Phosphate of soda dissolves in four times its weight of cold water, and in twice its weight of boiling water, the solution has a feeble alkaline reaction, this salt is nearly insoluble in alcohol.

ADULTERATIONS.—Phosphate of soda is in general tolerably pure; if the precipitate occasioned in a solution by chloride of barium be not entirely dissolved by nitric acid, a sulphate is present; and if that caused by nitrate of silver be not dissolved by nitric acid, a chloride is present.

THERAPEUTICAL EFFECTS.—A mild saline cathartic, resembling in its operation the sulphates of magnesia and soda, to either of which it should be preferred for children and delicate persons, in consequence of the mildness of its taste. It is particularly adapted as a cathartic for individuals affected with deposits of uric acid in the urine, as it possesses a remarkably solvent action on that acid.

DOSE AND MODE OF ADMINISTRATION.—ʒiv. to ʒxij.; it may be given in water or in any of the cathartic vegetable infusions; or it is readily taken by children dissolved in broth or soup, to which it imparts only a saline taste.

INCOMPATIBLES.—The mineral acids; lime water; magnesia; chloride of barium; nitrate of silver, and the acetates of lead.

SODÆ ET POTASSÆ TARTRAS, D. E. SODÆ POTASSIO-TARTRAS, L.

Tartrate of Soda and Potash; Rochelle salt.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia.—"Take of crystallized carbonate of soda of commerce, nine ounces; white bitartrate of potash, in fine powder, twelve ounces, or a sufficient quantity; distilled water, half a gallon: dissolve the carbonate of soda in the water, and to the solution, while boiling hot, gradually add the bitartrate, until a neutral solution is obtained. Let this be filtered, evaporate till a pellicle forms on its surface, and then set to crystallize. After twelve hours, the solution should be decanted off the crystals, and these, when dried on blotting paper, should be preserved in a bottle. By further concentrating the decanted solution, and cooling it, an additional crop of crystals may be obtained," D. "Bitartrate of potash, ℥xvj.; carbonate of soda, ℥xij.; boiling water, Oiv.; to the carbonate of soda dissolved in the water, add to neutralization, the bitartrate of potash; boil and filter; concentrate the liquor till a pellicle forms on its surface, then set it aside to cool and crystallize; the residual liquor will yield more crystals by further concentration and cooling," E.

PHYSICAL PROPERTIES.—This salt occurs in large, beautiful, transparent crystals, which are right rhombic six and twelve-sided prisms, generally produced in halves; inodorous, with a saline, somewhat bitter taste. Specific gravity, 1·757.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of soda, 1 of potash, 2 of tartaric acid, and 8 of water ($KO, Na O, 2C^8H^4O^{10} + 8HO$) WITTSTEIN. In very dry air it effloresces slightly, exposed to a moderate heat it fuses in its water of crystallization; by a strong heat it is decomposed, and converted into a mixture of charcoal and the carbonates of soda and potash. It dissolves in 2½ parts of cold, and one of boiling water.

ADULTERATIONS.—As this salt is generally sold in crystals, it is not liable to adulteration. The following are the characteristics and tests given for it in the last edition of the London Pharmacopœia:—"Soluble in water; the solution does not alter the colour of litmus or turmeric; bitartrate of potash is thrown down on the addition of sulphuric acid; it does not precipitate with nitrate of silver or chloride of barium, or should any precipitate occur, it is redissolved on the addition of more water."

THERAPEUTICAL EFFECTS.—A mild cooling laxative, not so active as most of the other saline cathartics, than which also its taste is less disagreeable; it is seldom prescribed alone, but is in very general use as the active ingredient in the commonly called Seidlitz (*Seignettes ?*) powders.

DOSE AND MODE OF ADMINISTRATION.—ʒij. to ʒvj. or ℥j. dissolved in a large quantity of water. *Seidlitz* powders consist of ʒij. of tartrate of soda and potash, and ℈ij. of bicarbonate of soda, reduced to powder and mixed, contained in a blue paper, and ʒss. of powdered tartaric acid in a white paper; they are taken, dissolved in from a half pint to a pint of water, while the liquid is in a state of effervescence; when an active purgative is required it will be requisite to use double the quantity of the tartrate of soda and potash. They form an agreeable and mild cooling aperient.

INCOMPATIBLES.—Most acids and acidulous salts; lime water; the salts of lime; and the acetates of lead.

SODÆ SULPHAS, D. L. E. *Sulphate of Soda. Glauber's salts.*

PREPARATION.—An article of the Materia Medica in the Dublin and London Pharmacopœias.—"Take of the salt which remains after making pure muriatic acid, ℔ij.; boiling water, Oiij.; white marble, in powder, a sufficiency; dissolve the salt in the water, add the marble so long as effervescence takes place; boil the liquid, and when neutral, filter it; wash the insoluble matter in boiling water, adding the water to the original liquid; concentrate till a pellicle begins to form, and then let the liquid cool and crystallize," E.

PHYSICAL PROPERTIES.—A solid, white salt, crystallized either in small acicular crystals, or in long prisms, the sides of which are often channeled; inodorous; with a cooling, saline, very bitter taste. Specific gravity, 2·246.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, 1 of acid, and 10 of water (NaO,SO^3+10HO). By exposure to the air it effloresces rapidly, loses all its water of crystallization, and a white powder is left. Heated it fuses, but at the temperature of 210° it becomes a white solid, which is again liquefied at a red heat but is not decomposed. Sulphate of soda is soluble in three parts of water at 60°, and in all proportions in boiling water. It is insoluble in alcohol.

THERAPEUTICAL EFFECTS.—An active saline cathartic, increasing remarkably the intestinal secretions; in its mode of operation it resembles sulphate of magnesia, and may be used in the same cases; in consequence, however, of its more disagreeable taste, and its tendency in some habits to produce griping, it is not so frequently employed as that salt.

DOSE AND MODE OF ADMINISTRATION.—ʒv. to ʒx. dissolved in from two to four ounces of water; ten or twelve drops of dilute sulphuric acid added to the solution conceal to a great extent its disagreeable taste. The effloresced salt is about twice as active as the crystals.

INCOMPATIBLES.—Carbonate and bicarbonate of potash; the salts of lime, and of baryta; the acetate and diacetate of lead; acetate of potash; and nitrate of silver, if the solution be strong.

SULPHUR SUBLIMATUM, D. SULPHUR, L. E. *Sublimed sulphur.* SULPHUR PRÆCIPITATUM, L. *Sulphur precipitated from sulphuret of calcium by hydrochloric acid,* L. *Lac sulphuris. Milk of sulphur.*

Sulphur or *Brimstone* is an elementary substance found in large quantities in an impure state, in the neighbourhood of volcanoes; it is also found combined with metals in many parts of the earth, and with hydrogen in many mineral waters. Crude sulphur is imported into Britain from Italy and Sicily. *Precipitated sulphur,* which was at one time very generally employed instead of sublimed sulphur, has nearly fallen into disuse in consequence of the very impure state in which it is usually sold; it has however been introduced into the last edition of the London Pharmacopœia, as an article of the Materia Medica.

PREPARATION.—Sublimed sulphur is an article of the Materia Medica in the Dublin and London Pharmacopœias; in the Edinburgh it is directed to be prepared "by subliming sulphur in a proper vessel, washing the powder thus obtained with boiling water in successive portions till the water ceases to have an acid taste, then drying the sulphur with a gentle heat." The following process for preparing precipitated sulphur is given by Wittstein:—Three parts of hydrate of lime, five parts of powdered sulphur, and twenty parts of water are boiled with constant stirring in an iron pot which must be only two-thirds full, for a quarter of an hour after the liquid has acquired a dark-yellow colour; then filtered. The residue is boiled with constant stirring in twenty parts of water; filtered and added to the preceding. When quite cold the clear solution is poured into a wooden vessel large enough to contain from 130 to 150 parts, diluted with forty to sixty parts of water. Hydrochloric acid (free from arsenic) of specific gravity 1·130, diluted with twice its weight of water, is then added until all effervescence ceases and the solution is acid: seven to eight parts of acid will suffice. (The fumes must be avoided). The precipitate which forms is washed by decantation with fresh water, until the washings are no longer acid and do not precipitate with oxalate of ammonia. It is then drained, pressed and dried with a gentle heat. The precipitate will weigh about 3½ parts.

PHYSICAL PROPERTIES.—Two kinds of sulphur are commonly met with in commerce, Roll-sulphur or Brimstone, and Flowers of Sulphur or Sublimed Sulphur. *Roll-sulphur* is in cylindrical pieces from two to three inches long, and nearly an inch in diameter, obscurely crystallized in the centre, crackling when held in the warm hand, very friable, and breaking with a shining crystalline fracture. *Sublimed sulphur* is in the form of a fine powder, which when examined by the microscope, is seen to be composed of crystalline grains; both kinds are of a bright, yellowish-green colour, with an almost imperceptible taste, and a faint peculiar odour when rubbed. Specific gravity, 1·98. Atomic weight, 16. Precipitated sulphur is a soft, pale-yellow powder without odour or taste.

CHEMICAL PROPERTIES.—Sulphur is a simple substance, insoluble in water and in alcohol. It fuses at 126° and between that temperature and 280°, it forms a clear liquor of an amber colour; at 320° it thickens, assumes a reddish tint, and if the heat be continued, becomes a thick tenacious mass; from 482° to its boiling point 601°, it becomes again more fluid, and finally rises in vapour before it is completely fused. Sulphur, if ignited, burns with a lambent blue flame, and is converted into sulphurous acid gas. Precipitated sulphur when fused by a gentle heat evolves a little hydrosulphuric acid, otherwise it corresponds chemically to sublimed sulphur.

ADULTERATIONS.—Flowers of sulphur seldom contain any impurities; those of a fixed nature may be detected by subliming; if any adhering sulphuric acid be present, distilled water agitated with the sulphur reddens litmus paper. Roll-sulphur usually contains a large quantity of orpiment *(sesquisulphuret of arsenicum)*, and therefore should not be used in medicine. The most ordinary adulteration of precipitated sulphur is with sulphate of lime, of which it frequently contains from 40 to 50 per cent. The presence of this impurity may be readily detected by heating any quantity of the preparation on a metallic plate, when the whole of the sulphur will be sublimed and any sulphate of lime it may contain left.

THERAPEUTICAL EFFECTS.—In large doses, sulphur acts as a mild cathartic, producing its effects by stimulating the muscular coat of the intestines, the evacuations caused by it being usually solid. In consequence of the mildness, but certainty of its operation, it is generally employed in hemorrhoidal diseases, and in stricture or other painful affections of the rectum. From being converted into sulphuretted hydrogen in the intestines, the evacuations and the insensible perspiration of the individual, during and for some time after its operation, are insupportably fetid, it is consequently not much used. By the majority of medical men even up to the present time sulphur is esteemed as the best cathartic in diseases of the skin; the origin of which opinion I can only trace to its efficacy when applied locally in the treatment of scabies (see *General Stimulants)*, in which disease its beneficial action is due to a direct effect on the itch insect. My own experience, a rather extended one in this class of diseases, is decidedly adverse to its employment as a purgative where there is the least tendency to inflammatory action in the skin.

DOSE AND MODE OF ADMINISTRATION.—As a cathartic, ʒiij. to ʒiv. made into an electuary with honey or treacle; it is usually given in combination with jalap and bitartrate of potash. The dose of precipitated sulphur is the same; it is less disagreeable to the smell or taste, and more uniform in its operation when pure.

Confectio Sulphuris, D. (Take of sublimed sulphur, two ounces; bitartrate of potash, one ounce; clarified honey, *by weight*, one ounce; syrup of ginger; syrup of saffron, of each, half a fluid ounce. Triturate all the ingredients in a mortar, until they are intimately mixed.) This preparation, long employed by practitioners, under the name of sulphur electuary, in the treatment of hemorrhoidal affections, has been introduced into the last Dublin Pharmacopœia. The dose of it is from ʒij. to ℥ss.

TAMARINDUS, D. L. E. *Tamarinds; Pulp of the fruit (pods, D.) of Tamarindus indica.* A native of the East Indies, from whence it has been carried into Africa, where it now grows plentifully in Upper Egypt; it is also cultivated in the West Indian Islands, and in South America. It belongs to the Natural family *Leguminosæ (Fabaceæ,* Lindley), and to the Linnæan class and order *Diadelphia Triandria.*

BOTANICAL CHARACTERS.—A beautiful tree, about thirty feet in height, branching superiorly; Leaves, abruptly pinnate, alternate; Flowers, in terminal, pendant racemes, of a lemon-yellow colour. Fruit, a legume, stalked, from three to four inches long, and nearly an inch broad, slightly compressed, 3-12 seeded; it is composed of a dry, brittle, brown shell, filled with a reddish, acidulous pulp, in which are imbedded the smooth, quadrangular seeds.

PREPARATION.—The pulp of the fruit is freed from the husk, and with the contained seeds is packed in layers in barrels, and boiling syrup poured over it; the drier and dark-coloured East Indian tamarinds are said to be preserved without sugar, (*Pereira*). In the London Pharmacopœia it is directed to be prepared for use in medicine by a process "similar to that for prepared Prunes," when it is termed *Tamarindus præparatus.*

PHYSICAL PROPERTIES.—Tamarinds, as imported, are of a reddish-yellow colour *(West Indian)*, or reddish-brown *(East Indian)*, of the consistence of candied honey, consisting of the pulp, the seeds, and numerous vegetable fibres ; they have a slightly vinous odour, and a sweet, very acid, somewhat astringent taste.

CHEMICAL PROPERTIES.—Tamarind pulp is composed of citric, tartaric and malic acids, bitartrate of potash, sugar, vegetable jelly, and parenchyma. It yields its properties to water, affording an acid solution.

ADULTERATIONS.—Tamarinds, as imported, frequently contain an appreciable quantity of copper ; sulphuric acid is also sometimes added to tamarinds which have not been well preserved or have been too long kept, to give them an acid taste. The contamination with copper may be detected by plunging a plate of polished iron, as a knife, into the tamarinds, when, should any copper be present, the iron will receive a coating of that metal. Sulphuric acid may be detected by a strained decotion giving with solution of chloride of barium or nitrate of baryta a white precipitate, insoluble in nitric acid. In the French market tamarinds are often met with which contain large quantities of animal charcoal, its presence may be readily detected by agitating the fruit with cold water.

THERAPEUTICAL EFFECTS.—Tamarind pulp is refrigerant and gently laxative, but though adapted for mild febrile or inflammatory affections occurring in children, it is seldom employed alone. Its combinations with senna have been before mentioned.

DOSE AND MODE OF ADMINISTRATION.—℥ss. to ℥iss.—Tamarind whey is prepared by boiling ℥j. of tamarinds with Oj. of new milk, and straining; it is an excellent, cooling, mild laxative drink in febrile diseases.

INCOMPATIBLES.—The salts of potash ; alkaline carbonates; lime water ; tartar emetic ; and the acetates of lead,

TEREBINTHINÆ OLEUM. *Oil of turpentine* (described in the division *Anthelmintics*), given in large doses, acts as an active cathartic; when administered alone, however, its action is uncertain, and consequently it is usually prescribed in combination with castor oil; in this form it proves a most effectual purgative, in obstinate constipation, especially when dependent on affections of the brain ; in spasmodic diseases, as in chorea, hysteria, epilepsy, and tetanus ; in sciatica and other neuralgic affections ; in tympanitis ; in passive hemorrhages ; and in purpura hemorrhagica : in the latter disease, administered in large doses, I have used it for years with very great success, (See *Dublin Journal of Medical Science*, vol. xxviii. p. 189.) The dose of oil of turpentine as a cathartic, is from f℥ij. to f℥ij., either given by the mouth or in the form of enema. (See, also, *Epispastics* and *General Stimulants*.).

VIOLA, L. E. *The fresh petals (flowers,* E.*) of Viola odorata.* An indigenous plant ; belonging to the Natural family *Violaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—An humble, perennial creeper; Leaves very numerous; cordate, nearly glabrous; Runners, flagelliform; Flowers, appearing in March and April, blue (after expansion turning deep purple), often white.

PREPARATION.—The flowers are gathered as soon as they expand, and dried with a stove heat between folds of bibulous paper; their properties are best preserved in the form of the syrup of violets of the pharmacopœias.

PHYSICAL PROPERTIES.—"Violet flowers are so remarkable for their odour and colour, that they have given a name to both." *(Duncan).*

CHEMICAL PROPERTIES.—They are composed of an odorous principle, blue colouring matter, sugar, gum, albumen, and some salts. Violets yield their active principles to water, but not to alcohol. The infusion is a delicate test for both acids and alkalies—the former changing its fine blue colour to red and the latter to green, and as such is much employed by chemists.

THERAPEUTICAL EFFECTS.—Violet flowers possess mildly laxative properties, and in the form of syrup are sometimes administered to new-born infants, and to young children.

DOSE AND MODE OF ADMINISTRATION.—Only as follows:—

Syrupus Violæ, L. E. ("Violet petals, ℥ix.; boiling distilled water, Oj.; sugar, ℔iij. or a sufficiency; rectified spirit, f℥iiss. or a sufficiency: macerate the violets in the water for 12 hours, express, strain, and set aside that the fæces may subside. Then add to the strained liquor more than double its weight of sugar and dissolve with a gentle heat. Finally, when the syrup is cold, add to each fluid ounce half a fluid drachm of the spirit," L. "Fresh violets, ℔j.; boiling water, Oiss.; pure sugar, ℔viiss.; infuse the flowers for 24 hours in a covered-glass or earthenware vessel; strain without squeezing, and dissolve the sugar in the filtered liquor," E.). Dose, fʒj. to fʒiv.

Mel Violæ, (Fresh violet flowers, one part; honey, five parts.) A mild laxative readily taken by children; Dose, ʒj. to ℥ss.

CHAPTER VI.

CAUSTICS.

(Escharotics.—Cauterants.—Catheretics.)

CAUSTICS are substances which, applied to the human body, disorganise and destroy the parts with which they come in contact. They are usually grouped in two classes :—*Escharotics,* which completely destroy the life of the part to which they are applied, affecting also the deeper seated tissues to a greater or less degree, according to the energy of the substance and the quantity of it that may be applied, and producing an *eschar,* whence their name ; and *Catheretics,* which are milder in their operation, acting more superficially and not effecting complete destruction of the parts with which they are placed in contact. The action of caustics is chemical, as they destroy the life of the part, either by combining with the animal matter, so as to form a new compound, or by causing the elements of the animal tissues to enter into new combinations, whereby their cohesion is subverted and their composition changed. The effects produced by caustics are more or less rapid, according to the properties of the substance that is used ; if it be very powerful the change of structure effected is so immediate, that surrounding inflammation takes place only after the death of the part ; while on the contrary, inflammation is the direct consequence of the less energetic caustics. The action of this class of remedies is generally local, but some of them (as arsenious acid), may become absorbed, and thus produce constitutional symptoms. The various purposes for which caustics are employed will be noticed when treating of the individual remedies of the class. Lately attention has been very much directed to the most effectual method of the application of caustics for the destruction of malignant growths, especially cancer, in consequence of some experiments which have been carried on by an American medical practitioner in one of the London hospitals under the sanction of the surgeons of the institution. The only general result of therapeutic importance which has been arrived at is, that more decided effects will be obtained from the employment of these agents when their application is combined with the use of incisions with the knife into the parts to be removed, so as to extend the action of the caustic through the tissues as their vitality is destroyed.

ACIDUM ACETICUM GLACIALE, D. ACIDUM ACETICUM, E.—*Acetic acid. Glacial acetic acid.*

ACIDUM ACETICUM E LIGNO VENALE, D. ACIDUM ACETICUM, L. ACIDUM PYROLIGNEUM, E. *Acetic acid of commerce, Purified pyroligneous acid, specific gravity* 1·044, D. *An acid prepared from wood by heat, and purified,* L. *Diluted acetic acid, obtained by the destructive distillation of wood,* E.

ACIDUM ACETICUM FORTE, D.—*Acetic acid slightly diluted.*

PREPARATION.—Acetic acid is an article of the Materia Medica in the last edition of the London Pharmacopœia. ACIDUM ACETICUM GLACIALE, D. "Take of acetate of lead any convenient quantity. Place it in an oven, at about the temperature of 300°, until it ceases to lose weight, and having then brought it by trituration to a fine powder, let it be introduced into a flask or retort, and exposed to an atmosphere of dry muriatic acid gas, until very nearly the whole of it exhibits a damped appearance. The flask or retort being now connected in the usual manner with a Liebig's condenser, let heat be applied by means of a chloride of zinc bath, until the entire of the acetic acid shall have distilled over. The muriatic acid gas should be *slowly* disengaged from the materials directed in the formula for *Acidum Muriaticum*, using eight ounces of salt for every pound of anhydrous acetate of lead; and to render it quite dry, it should, before being conducted into the vessel containing the sugar of lead, be made to bubble through oil of vitriol, and then pass through a long tube packed with small fragments of fused chloride of calcium. The specific gravity of this acid is 1065." ACIDUM ACETICUM FORTE, D. "Take of glacial acetic acid, six fluid ounces; distilled water, four ounces. Mix. The specific gravity of this acid is 1066." ACIDUM ACETICUM, E. "Take of acetate of lead any convenient quantity, heat it gradually in a porcelain basin by means of a bath of oil or fusible metal (8 tin, 4 lead, 3 bismuth), to 320°, F.; and stir till the fused mass concretes again; pulverise this when cold, and heat the powder again to 320°, with frequent stirring, till the particles accrete, add ℥vj. of the powder to f℥ixss. of pure sulphuric acid contained in a glass matrass; attach a proper tube and refrigeratory, and distil from a fusible metal bath with a heat of 320°, to complete dryness. Agitate the distilled liquid with a few grains of red oxide of lead to remove a little sulphurous acid, allow the vessel to rest for a few minutes, pour off the clear liquid and redistil it." Pyroligneous acid is an article of the Materia Medica in the Dublin and Edinburgh Pharmacopœias.

PHYSICAL PROPERTIES.—The acetic acid of commerce, which is officinal in the three British Pharmacopœias, is prepared by manufacturers of pyroligneous acid, and is usually sufficiently pure and concentrated for most medical purposes. Glacial acetic acid, as procured by the processes given above, is used for the purpose of preparing the strong acid of the Dublin College. The Edinburgh College uses it undiluted. Acetic acid is a limpid colourless liquid, with a very pungent refreshing smell, and a caustic, highly acid taste. The specific gravity of the London preparation, which is weaker than any of those of the other colleges, is 1·048; it contains 30·8 per cent. of real acid. The specific gravity of the pyroligneous acid of the Edinburgh College is stated to be *at least* 1·034.

CHEMICAL PROPERTIES.—Acetic acid, *Glacial acetic acid,* consists of one equivalent of anhydrous acetic acid ($C^4 H^3 O^3$), and one of water ; it crystallizes at 60°, and is vaporizable at 248° F. ; when of the density 1·063, one hundred minims (97 grains) neutralize nearly 242 grains of crystallized carbonate of soda. Pyroligneous acid *(Dublin)* contains, according to Mohr's table, 33 per cent. of hydrated acetic acid, while that of the Edinburgh College contains but 25 per cent. Acetic acid *(London)* consists of one equivalent of anhydrous acid, and thirteen of water ; 100 grains neutralize 87 grains of crystallized carbonate of soda. Acetic acid reddens litmus paper, and its vapour fumes with ammonia ; it combines with many of the metallic oxides forming crystallizable salts ; it dissolves the vegetable alkaloids, camphor, resins, fibrine, albumen, and also the active principles of many vegetable medicines, in consequence of which properties it is much employed in pharmacy.

ADULTERATIONS.—It should be of the prescribed density ; if lighter it probably does not contain sufficient of the anhydrous acid, but as before remarked with respect to vinegar, this test is not to be depended on ; the strength can be more accurately ascertained by its neutralizing power over carbonate of soda. It is sometimes adulterated with sulphuric or hydrochloric acid ; the former may be detected by the production of a white precipitate insoluble in nitric acid on the addition of a solution of chloride of barium or nitrate of baryta ; the latter by a similar precipitate being produced on the addition of a solution of nitrate of silver. The occasional impregnation with lead or copper is readily detected by sulphuretted hydrogen, causing a black precipitate.

USES.—Acetic acid undiluted acts quickly and powerfully on the skin, causing redness and vesication, and destroying the life of the part if left sufficiently long in contact with it. It has been employed as a ready means of producing vesication ; but its chief use is as a caustic to destroy corns and warts, the latter especially when of syphilitic origin.

ACIDUM MURIATICUM VENALE, D. ACIDUM MURIATICUM, E.—*Commercial muriatic Acid ; Hydrochloric acid of commerce.*

ACIDUM MURIATICUM PURUM, D. E. ACIDUM HYRROCHLORICUM, L.—*Pure muriatic acid. Hydrochloric acid. An acid prepared from chloride of sodium,* L.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin*—"Take of dried chloride of sodium, three pounds ; oil of vitriol of commerce, forty-four fluid ounces ; water, thirty-two ounces ; distilled water, forty-four ounces : dilute the oil of vitriol with the thirty-two ounces of water, and when the mixture has cooled, pour it upon the salt, previously introduced into a globular flask having a capacity of at least one gallon. A gentle heat being now applied, let the muriatic acid gas, as it escapes, be conducted into a bottle containing the distilled water, by means of a bent tube dipping about half an inch beneath its surface, and let the process be continued until the product measures three pints. Throughout this operation, particularly towards its close, the temperature of the water which absorbs the gas must, by the application of external cold, be prevented from rising. The specific gravity of this acid is 1176." *Edinburgh.*—" Purify muriate of soda by dissolving it in boiling water, concentrating the solution, skimming off the crystals as they form on the surface, draining from the adhering solution, and washing the crystals slightly with cold water: take of this salt previously well dried, of pure sulphuric acid, and of water, equal weights; put the salt into a glass retort, and add the acid previously diluted with a third part of the water and allowed to cool; fit on a receiver which contains the rest of the water, distil with a gentle heat by means of a sand-bath or a naked coal-gas flame, so long as any liquid passes over, preserving the receiver cool by snow or a stream of cold water.

PHYSICAL PROPERTIES.—A limpid colourless liquid, with a yellowish tinge when not quite pure, having a suffocating odour, and an intensely acid, pungent, disagreeable taste. The specific gravity of the liquid acid of the Dublin Pharmacopœia is 1·176, that of London, 1·160, and that of Edinburgh, 1·170.

CHEMICAL PROPERTIES.—It is a solution of hydrochloric acid gas ($H\,Cl$) in water; the Dublin preparation contains about 36 per cent. of real acid, the London about 32, and the Edinburgh about 34 per cent. Exposed to the air, hydrochloric acid emits suffocating fumes which become white in contact with the vapour of ammonia; it possesses the usual characteristics of a strong acid.

ADULTERATIONS.—It should be of the prescribed density, that being a perfect test of its strength; it is frequently contaminated with iron and with chlorine, to the presence of either or both of which, or of organic matter, is due the yellow colour of the impure acid; the iron may be detected by solution of ferrocyanide of potassium producing a blue precipitate with the neutralized acid; and chlorine by the acid dissolving leaf gold. The presence of sulphuric acid, an occasional impurity, is indicated by the solution of nitrate of baryta or chloride of barium occasioning a white precipitate in the acid previously diluted. "100 grains are saturated by 132 grains of crystallized carbonate of soda," L.

USES.—As a caustic, hydrochloric acid has been used with much effect to destroy the false membranes which are formed in diphtheritis, to check the spreading of the mortification in cancrum oris, and as an application to obstinate ulcers of the tongue and in phagedenic ulceration of the tonsils. It has been also employed as an external application in hospital gangrene. It may be applied by means of a bit of sponge attached to whalebone, or wood.

In cases of poisoning with this acid, the antidotes are chalk, and magnesia or its carbonate, combined with demulcent or emollient drinks.

ACIDUM NITRICUM VENALE, D. ACIDUM NITRICUM, E.—*Commercial nitric acid.*

ACIDUM NITRICUM PURUM, D. E. ACIDUM NITRICUM, L.—*Pure nitric acid. An acid prepared from nitrate of potash,* L.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin.*—"Take of nitrate of potash, two pounds; nitrate of silver, two drachms, or as much as may be necessary; boiling distilled water, five pints; oil of vitriol of commerce, seventeen fluid ounces; dissolve the nitrate of silver in two ounces, and the nitrate of potash in the remainder of the water, and add by degrees the former solution to the latter, until a precipitate ceases to form. Pass now through a calico filter, and, having evaporated to perfect dryness the clear liquid thus obtained, introduce the residuum into a retort, whose neck is made to pass at least five inches into the glass tube of a Liebig's condenser; then pour upon it the oil of vitriol, and with a heat which, towards the close of the process, must be raised so as to liquefy the contents of the retort, cause the nitric acid to distil over. The specific gravity of this acid is 1500." *Edinburgh.*—"Purify nitrate of potash, if necessary, by two or more crystallizations, till nitrate of silver does not precipitate its solution in distilled water; put into a glass retort equal weights of this purified salt and of sulphuric acid, and distil into a cooled receiver with a moderate heat from a sand-bath or naked gas-flame, so long as the fused material gives off vapour: the pale yellow acid thus obtained may be rendered colourless, should this be desired, by heating it gently in a retort."

PHYSICAL PROPERTIES.—A dense colourless liquid—when not quite pure having an orange hue, with a powerful, disagreeable odour, and an intensely acid, caustic taste. The specific gravity of the officinal acid in the Dublin and Edinburgh Pharmacopœias is 1·500, in that of London 1·420.

CHEMICAL PROPERTIES.—It is composed of anhydrous nitric acid ($N O^5$), and water; the pure acid of the Dublin and Edinburgh Pharmacopœias contains about 80 per cent. of real acid, that of London 60 per cent. Nitric acids emits white fumes in the air, which become much denser when mixed with the vapour of ammonia. It stains the cuticle yellow, and destroys what ever animal tissues it comes in contact with. It possesses the usual characteristics of a strong acid. The best test for distinguishing nitric acid from the other mineral acids, is the action on morphia or its salts, which it immediately turns deep orange.

Any slight adulterations which are met with in nitric acid are unimportant with reference to its medicinal use. The density is the best characteristic of its strength. "100 grains (*London acid*) are saturated by 161 grains of crystallized carbonate of soda," L.

USES.—As a caustic, strong nitric acid is employed to destroy corns and warts, as an application to poisoned wounds, to parts bitten by rabid animals, and to phagedenic ulcers; its application to certain forms of hemorrhoids also has been very favorably mentioned by the late Dr. Houston of this city, (See *Dublin Journal of Medical Science*, 1st series, vol. xxiii. p. 102.) In its application for any of the above purposes, the neighbouring parts should be smeared with olive oil or some resinous ointment so as to confine the action of the acid. M. Rivallié has recently proposed what he terms *solidified nitric acid* as a substitute for the ordinary nitric acid as a caustic. He prepares it as follows:—Some lint is placed in an earthen vessel, and a certain quantity of nitric acid in its highest degree of concentration is gradually dropped upon it; a gelatinous paste is the result, and to this a shape in keeping with the tissues to be cauterized is given. It is applied by means of a long (wooden) forceps, and left on according to the desired effect, from 15 to 20 minutes; in cases, however, where the surgeon wishes to destroy a large surface, as for example in encephaloid cancer, it may be left on for 24 hours. The advantages which M. Rivallié states this caustic to possess, are, that it is not so painful as liquid nitric acid, and that its action is limited to the part to which it is applied, and does not spread to the neighbouring tissues.

In cases of poisoning with this acid, the antidotes are the same as for hydrochloric acid.

ACIDUM SULPHURICUM. *Sulphuric acid* (described in the division *Astringents*), possesses powerfully caustic properties, destroying the animal tissues wherever it is brought in contact with them. It is used as a caustic to the integument of the eyelid in *entropium* or inversion of the lid, and to the conjunctiva reflected on the eyelid in *ectropium* or eversion of the lid. It is also employed to destroy warts, and as an application to poisoned wounds. M. Velpeau speaks most highly of a caustic paste prepared by mixing 2 parts of concentrated sulphuric acid with 1 part of saffron. He uses it chiefly as an application to cancerous and other malignant ulcerations. In consequence of the expense of saffron, however, this caustic cannot be generally used; Mr. Syme employs saw-dust instead, and he states with good results.

AMMONIÆ LIQUOR FORTIOR, D. L. AMMONIÆ AQUA FORTIOR, E. *Concentrated aqueous solution of ammonia. Strong ammonia.* This preparation resembles in its physical properties that already described in the division *Antacids*; in its chemical properties it differs only in containing more ammonia, its density being 900, D., 882 at 62°, L., and 880, E. In the London Pharmacopœia it is an article of the Materia Medica; in the Edinburgh, the same process is followed for both solutions. The London College states that "it may be reduced to the strength of ordinary liquor ammoniæ by adding to every ounce two ounces of distilled water, and that 100 grains contain nearly 30 grains of ammonia." The two following processes for the preparation of the strong solution are given by the Dublin College:—

PREPARATION.—*Dublin.* Apply heat to a mixture of sal ammoniac and slaked lime, using the proportions given in the preceding formula, [that for ammoniæ liquor] and cause the gas, as it is disengaged, to pass to the bottom of a bottle containing eight ounces of *Ammoniæ Liquor*; the temperature of the latter being prevented from rising by surrounding it with cold water, which should be frequently renewed. *Or*, Pass the ammoniacal gas disengaged from eight ounces of sal ammoniac into five ounces of distilled water, taking care to keep the receiver cool. The specific gravity of this solution is 900.

USES.—As a caustic, it has been only used locally, in the bites of rabid animals. (See, also, *Epispastics*).

ANTIMONII TERCHLORIDI LIQUOR, D. *Solution of terchloride of antimony. Butter of antimony.*

PREPARATION.—Take of prepared sulphuret of antimony, one pound; muriatic acid of commerce, four pints. Upon the sulphuret, placed in a porcelain capsule, pour the acid, and constantly stirring it, apply to the mixture, beneath a flue with a good draught, a gentle heat, which must be gradually augmented as the development of the gas begins to slacken, and finally carried to ebullition, and maintained at this temperature for fifteen minutes. The vessel being now removed from the fire, let its liquid contents be separated by filtration through calico, returning what passes through first, in order that a perfectly clear solution may be obtained. Transfer the liquid to another capsule, and, having boiled it down to the bulk of one quart, allow it to cool, and preserve it in a bottle furnished with a well-ground glass stopper. The specific gravity of this solution is 1470.

PHYSICAL PROPERTIES.—A transparent liquid of a wine yellow colour, with the odour of hydrochloric acid, and a strongly acid caustic taste. The commercial article is of a deep reddish-yellow colour in consequence of its containing a little nitrous acid and hydrochlorate of iron.

CHEMICAL PROPERTIES.—The preparation of the Dublin Pharmacopœia is a solution of terchloride of antimony in water. It emits white fumes in the air; left exposed, it evaporates spontaneously, leaving as a residuum a white semi-crystalline mass; mixed with water it throws down a yellowish-white powder, formerly called *Powder of Algaröth,* (oxychloride of antimony). The solution of terchloride of antimony has a powerfully acid reaction.

USES.—It is employed as a caustic to parts bitten by rabid animals, its liquidity enabling it to penetrate into the deepest portions of the wound: the wound should be first dried as well as possible with pieces of lint, as all liquids immediately decompose this preparation. Pure chloride of antimony has been used as an application to staphyloma by some German surgeons; a camel's-hair-pencil or a point of lint is dipped in the deliquescent salt and applied to the tumour until a whitish crust is perceived, when the whole is washed away by means of a large camel's-hair-pencil dipped first into milk and afterwards into milk and water.

In cases of poisoning with the solution of the terchloride of antimony the same treatment should be employed as in poisoning with hydrochloric acid.

ARGENTI NITRAS, L. E. ARGENTI NITRAS FUSUM, D. *Nitrate of silver. Lunar caustic. Fused nitrate of silver,* D. L.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia.—"Take of refined silver, three ounces; pure nitric acid, two fluid ounces; distilled water, five ounces. Place the silver in a flask, and, having poured upon it the acid and water, apply a gentle heat until the metal is dissolved. Transfer the solution to a porcelain capsule, decanting it off a heavy black powder which appears at the bottom of the flask, and, having evaporated it to dryness, raise the heat (in a dark room) until liquefaction is produced. Pour the melted nitrate of silver into a brass mould furnished with cylindric cavities of the size of a goose quill, and which admits of being opened by a hinge, and, when the salt has concreted, remove it, and preserve it in well-stopped bottles rendered impervious to light," D. "Take of pure silver, ℥iss.; pure nitric acid, f℥j.; distilled water, f℥ij.; dissolve the silver in the acid and water with the acid of a moderate heat, then gradually raise the heat till the water is all expelled; fuse the remaining salt in an earthen-ware or porcelain crucible, and pour the fused matter into iron moulds previously heated and greased slightly with tallow: preserve in glass vessels," E.

PHYSICAL PROPERTIES.—A solid salt in the form of rods or pencils, smooth and polished on the surface, of the thickness of a writing pen. They have a crystalline fracture, and are of a grayish slate colour, inodorous, with a bitter caustic and metallic taste.

CHEMICAL PROPERTIES.—Nitrate of silver is composed of one equivalent of nitric acid, and one of oxide of silver (AgO, NO^5). It is not deliquescent; is soluble in its own weight of water at 60°, and in 4 parts of rectified spirit; heated it fuses, and by a red heat is decomposed and metallic silver obtained. Exposed to light in contact with the smallest trace of organic matter, it becomes brown or blackish. It stains the cuticle black. The best test for nitrate of silver in solution is the addition of any of the soluble chlorides (as chloride of sodium), a white curdy precipitate is thereby formed which becomes black on exposure to strong light, and is soluble in ammonia but not in either cold or boiling nitric acid.

ADULTERATIONS.—Nitrate of silver, as met with in commerce, is frequently adulterated with nitrates of potash, lead, zinc, and copper, and with black oxide of manganese. The latter is detected by dissolving the salt in water, when it is left in the form of a black powder; the nitrates of lead, zinc, and copper are detected by precipitating a solution of the salt with excess of solution of chloride of sodium; the precipitate is not entirely soluble in ammonia if lead be present, and the liquid part gives with sulphuretted-hydrogen a white precipitate if any zinc was present, but a black one if the impurity was copper. Nitre is detected by precipitating the silver with hydrochloric acid, filtering and evaporating, when if any be present it will be obtained in the crystalline state.

USES.—As a caustic, nitrate of silver possesses many advantages over the other remedies of this class, and consequently is much more frequently employed; applied to the skin or to the mucous membranes, it produces a whitish stain which rapidly becomes greyish, and if exposed to light, finally black; and at the same time the part to which it is applied is deprived of vitality. The chief value of nitrate of silver as a caustic depends on its great manageableness in consequence of its solid form, on its property of not deliquescing, and on its mild but effectual action, the pain produced by it, although sometimes acute, being but of short duration. Its uses are very numerous: it is employed to destroy warts, corns, and many small tumours; to check hemorrhage occurring from small vessels, as in the bleeding from leech-bites in children; to repress exuberant granulations; and applied to the sound skin above the inflamed part, to stop the spread of erysipelas, to effect which it must be applied freely so as to destroy the rete-mucosum as well as the cuticle. In the first stage of chancre, when the ulcer is very minute, nitrate of silver applied freely generally checks the disease and prevents it from spreading further; indeed in all sores about the prepuce or glans, whether of syphilitic origin or not, its application is for the most part beneficial In large indolent ulcers applied over the whole surface, it acts with excellent effect; in many instances as soon as the eschar which it produces peels off, the sore is found to be healed. A strong solution, from ℈ij. to ʒj. in an ounce of distilled water, is the best application in relaxation with enlargement of the uvula and tonsils, and in follicular inflammation of the mucous membrane of the pharynx and larynx. When the disease affects the lining membrane of the larynx, it has been proposed by Dr. Horace Green, of New York, to introduce the solution within the rima glottidis, and thus apply it directly to the mucous membrane of the organ; and this practice is now often adopted with excellent effect: the operation is easily performed by means of a piece of sponge attached to a curved whalebone rod. The same treatment has been proposed for croup in its acute stage; and more recently still Dr. Green has injected a solution into the bronchial tubes in obstinate chronic bronchitis. As a topical application in the solid state or in the form of a strong solution, it is most valuable in ulcerations of the cornea, and in purulent and gonorrhœal ophthalmia; a weaker solution (gr. ij. to gr v. to f℥j. of water, may be employed in both acute and chronic conjunctivitis; it is, however, liable to produce specks on the cornea or dark stains on the conjunctiva, as first observed by Professor Jacob of this city Nitrate of silver has been also used in the solid state to remove strictures of the urethra and œsophagus, applied by means of a bougie into the point of which it is inserted *(armed or caustic bougie)*, but the practice is attended with danger. In gonorrhœa occurring in females, a pencil of nitrate of silver is applied freely to the mucous membrane of the vagina, it is said with much benefit; and in the same disease in males an injection varying in strength from gr. ij. to gr. xx. dissolved in f℥j. of water, is injected into the urethra; such treatment, however, is not unattended with risk. Nitrate of silver is also employed with benefit as a topical application in many forms of ulcerations of the gums, the tongue, and the fauces; in excoriations of the nipples; in the chronic stages of eczema, impetigo, and other diseases of the skin; and in the acute stage of herpes preputialis, and herpes labialis. (See, also, *Tonics*).

ARSENICI OXYDUM ALBUM VENALE, D.—*White oxide of arsenic of commerce.*

ACIDUM ARSENIOSUM PURUM, D. ACIDUM ARSENIOSUM, L. ARSENICUM ALBUM, E.—*White oxide of arsenicum. Pure arsenious acid. Arsenic. A metallic acid prepared by sublimation*, L.

PREPARATION.—Arsenious acid is an article of the Materia Medica; it is prepared by roasting metallic ores in which the metal is contained, especially the arseniuret of cobalt, in a reverberatory furnace to which is attached a long chimney in a horizontal direction; the arsenic is deposited on the floor of the chimney in the form of a grey powder which is refined by sublimation. The Dublin College directs a resublimation, for medical purposes, *Acidum Arseniosum purum*, which, however, is not required in consequence of the good quality of what is met with in commerce in the present day; the process is as follows:—Take of commercial white oxide of arsenic, any convenient quantity; place it in a Florence flask, the neck of which is made to pass into that of a second flask of larger size, and applying to the *former* a regulated heat, by suspending it beneath a semi-cylindric hood of sheet iron, a few inches above a small charcoal fire, cause the arsenic to sublime into the *latter*. This sublimation should be conducted under a flue with a good draught, so as to protect the operator from inhaling any vapours which may escape being condensed.

PHYSICAL PROPERTIES.—In large vitreous cakes or masses, whitish, sometimes having a yellow tinge; transparent, but on exposure to the air soon becoming opaque like enamel, the opacity gradually extending to the centre of the masses; the cakes are moderately hard and brittle. Arsenic is inodorous; it is also nearly tasteless, but when the tongue is kept for a few moments in contact with a piece of arsenic, a slightly bitter and acrid taste afterwards becoming sweetish may be perceived. Its specific gravity, when transparent, is 3·738, and when opaque, 3·699.

CHEMICAL PROPERTIES.—It is composed of one equivalent of the metal arsenic, and three equivalents of oxygen ($As\,O^3$). Exposed to a heat of 380° F., it sublimes unchanged, and as it cools condenses into small transparent crystals of adamantine lustre, which are regular octohedrons. At ordinary temperatures, water dissolves from an 800th to a 400th of its weight of powdered arsenious acid; boiling water dissolves nearly a ninth of its weight, and on cooling to 60°, retains a 35th (Christison). The solution reddens litmus paper slightly. The chemical characteristics of arsenious acid are as follows. :—thrown on red-hot charcoal or cinders it evolves a scarcely visible vapour, *metallic arsenic*, which has a strong alliaceous odour, and which at the distance of a few inches from the charcoal is converted into a dense white odourless smoke, *arsenious acid*; heated with carbonaceous matter in a glass tube, it is reduced and the metal sublimed, forming a greyish-black ring in a cooler part of the tube, and which by the application of heat to the outside of the glass is resublimed in the form of arsenious acid; its solution precipitates lemon-yellow with ammoniacal nitrate of silver, grass-green with ammoniacal sulphate of copper, and sulphur-yellow with sulphuretted hydrogen; put into a proper apparatus, as Marsh's test tube, or a Döbereiner's lamp, with zinc and sulphuric acid, arseniuretted hydrogen will be evolved, which, being ignited as it passes through the fine aperture of the exit tube, deposits metallic arsenic on a plate of glass or porcelain held in the flame, and arsenious acid if held a little above the flame: and, finally, if an aqueous solution of arsenious acid be boiled with pure hydrochloric acid, and clean copper foil, or fine copper gauze, or copper wire, the latter acquires an iron-grey coating of metallic arsenic *(Reinsch's test)*. The following characteristics and tests for arsenic are contained in the last edition of the London Pharmacopœia:—" White or slightly yellowish, usually opaque, sometimes when freshly broken more or less translucent ; heated in a glass tube it is sublimed of a white colour, but as the sublimate cools it is converted into octohedral colourless crystals. Mixed with charcoal and heated it is reduced to metallic arsenic and sublimes, exhaling an alliaceous odour, which sublimate when cold adheres to the inside of the tube with a metallic lustre. It is dissolved by boiling water from which as it cools it crystallizes in octohedres. From the solution hydrosulphuric acid throws down a yellow precipitate ; ammonia, nitrate of silver being afterwards added, a citrine coloured precipitate ; and potash, with sulphate of copper, a green precipitate. If 100 grains be boiled in dilute hydrochloric acid and hydrosulphuric acid added when the liquor is cold, 124 grains of tersulphuret of arsenic are procured."

ADULTERATIONS.—Arsenious acid seldom contains any impurities ; as sold in the form of powder, it is sometimes adulterated with chalk or sulphate of lime, or it may accidently contain a little oxide of iron ; any of them may be detected by the application of heat, which sublimes the acid and leaves the impurity.

USES.—Arsenious acid is a powerful caustic, producing death of the part to which it is applied, which subsequently separates by sloughing ; in consequence, however, of the danger which may occur from its absorption, it is but seldom employed in regular practice in the present day. The cases in which it has been found of use are, malignant or cancerous ulcerations, especially of the skin of the face, in lupus, in onychia maligna, and in hospital gangrene. It may be applied in the form of ointment made with axunge or spermaceti, powdered opium being added to allay the pain produced. Dangerous symptoms are less likely to arise from its absorption, if an ointment containing a tenth or a sixth of its weight of the acid be employed, than if a weaker preparation be used. (See, also, *Tonics.*)

Arsenical paste, CAZENAVE. (Arsenic, 2 parts ; sulphate of mercury, 1 part ; animal charcoal, 2 parts ; mix.) When required for use, a few drops of water are added to this powder so as to form it into a thin paste, which is spread upon the surface to be acted on, this should never exceed an inch in diameter at each application.

Arsenical caustic powder, (Arsenic, 8 parts ; dragon's blood; and cinnabar, of each, 15 parts ; mix and reduce to a fine powder.) This powder is made into paste, with a little saliva or gum-water just before it is applied.

CUPRI SUBACETAS, D. ÆRUGO, D. L. E.—*Subacetate of copper ; Verdigris; Impure diacetate of copper. Diacetate of copper*, L.

PREPARATION.—An article of the Materia Medica, obtained by placing plates of copper in contact with the fermenting marc of the grape, or with cloths dipt in vinegar. The Dublin college directs this article to be prepared for medical use, *Cupri subacetas præparatum*, by the following process :—Take of subacetate of copper, a convenient quantity : reduce it to powder by careful trituration in a porcelain mortar, and separate the finer parts for use by means of a sieve.

PHYSICAL PROPERTIES.—In coarse masses or in powder, either of a beautiful pale bluish-green colour (*green verdigris*), or of a rich blue (*blue verdigris*) with a disagreeable acetous odour, and a styptic metallic taste.

CHEMICAL PROPERTIES.—*Blue* verdigris is the hydrated diacetate of copper, and *green* verdigris consists of the subsesquiacetate and the trisacetate (Berzelius). Verdigris is permanent in the air; heated it first loses water, then acetic acid, and the residue contains metallic copper; water resolves it into a soluble acetate, and an insoluble trisacetate. It is dissolved entirely by both sulphuric and hydrochloric acids.

ADULTERATIONS.—The slight impurities, metallic copper or earthy matters present in commercial verdigris are of no importance; they may be detected by its solubility in sulphuric or hydrochloric acid.

USES.—As a caustic it is applied to indolent ulcers, to venereal warts, and to fungous growths; it is also a useful application in ophthalmia tarsi; and has been employed in chronic diseases of the scalp, when they are of an indolent and obstinate character. It may be used in powder, or in either of the following forms:—

Unguentum Cupri subacetatis, D. *Unguentum Æruginis*, E. ("Prepared subacetate of copper, ʒss.; ointment of white wax, ʒvijss.; triturate the subacetate of copper with the ointment until they are intimately mixed," D. "Resinous ointment, ℥xv.; verdigris, in fine powder, ℥j.; melt the ointment, sprinkle into it the powder of verdigris, and stir the mixture briskly as it cools and concretes," E.).

Linimentum Æruginis, L. (Verdigris, in powder, ℥j.; vinegar, f℥vij.; honey, ℥xiv.; dissolve the verdigris in the vinegar, strain through a linen cloth; add the honey, and boil to a proper consistence.) A mild caustic, applied to venereal ulcers of the mouth and tonsils, to malignant ulcers of the tongue, and to the ulcerated sore throat of scarlatina.

In cases of poisoning with verdigris, the best antidote is albumen.

CUPRI CARBONAS. *Carbonate of copper.* This preparation, obtained by precipitating a solution of sulphate of copper with carbonate of soda, though not contained in any of the British Pharmacopœias, deserves a short notice, in consequence of the success said to be obtained from its use in the chronic forms of impetigo and eczema of the scalp, by M. Devergie in the *Hôpital Saint Louis* at Paris; he employs it in the form of ointment, prepared by mixing intimately ʒij. of the powder with ℥j. of axunge.

CUPRI SULPHAS. *Sulphate of copper* (described in the division *Astringents*) is used in the solid state as a caustic, to repress excessive granulations, to destroy venereal warts, in chronic diseases of the conjunctiva, and to excite a new action in indolent ill-conditioned ulcers; it is also applied with much benefit to chancres in their early stage.

HYDRARGYRI OXYDUM RUBRUM, D. E. HYDRARGYRI NITRICO-OXYDUM, L. *Nitric oxide of mercury; Red oxide of mercury; Red precipitate.*

PREPARATION.—*Dublin.* "Take of pure mercury, eight ounces; pure nitric acid, three fluid ounces; distilled water, six ounces: in the acid, diluted with the water, digest the mercury, using at first a very gentle heat, but, when the action has ceased, finally boiling for a few minutes; and, having decanted the solution, evaporate to dryness. Let the residuum, first reduced to powder, be transferred to a shallow cast-iron pot with a flat bottom, and loosely covered by a fire-tile lid; and in this let it be exposed to the heat of a slow fire until red vapours cease to be given off. The heat must now be withdrawn, and, when the pot has cooled, its contents should be transferred to bottles." *London.*—"Mercury, ℔iij.; nitric acid, f℥xviij.; distilled water, Oij.; mix in a proper vessel, and with a gentle heat dissolve the mercury, boil away the liquor, and pulverize the residuum; put this into a shallow vessel, and apply a gentle heat, gradually increasing until red vapour ceases to arise." *Edinburgh.*—"Mercury, ℥viij.; dilute nitric acid (D. 1280), f℥v.; dissolve half the mercury in the acid with the aid of a gentle heat, and continue the heat until a dry white salt be left; triturate the rest of the mercury with the salt till a fine uniform powder be obtained; heat the powder in a porcelain vessel, and constantly stir it till acid fumes cease to be disengaged."

PHYSICAL PROPERTIES.—In brilliant, micaceous masses, varying in colour from orange-yellow to bright scarlet; inodorous, with a taste at first faintly, then strongly, caustic and metallic. Specific gravity, 11·074. In fine powder its colour is yellow.

CHEMICAL PROPERTIES.—It is composed of one equivalent of mercury, and one of oxygen, generally containing a little undecomposed nitrate of mercury; exposed to a red heat, the oxide of mercury is entirely volatilized in the form of oxygen and metallic mercury. It is very sparingly soluble in water, boiling water dissolving about a 7000th of its weight; is very soluble in hydrochloric, acetic, and hydrocyanic acids; but is insoluble in alcohol.

ADULTERATIONS.—The nitric-oxide of mercury sometimes contains nitric acid, which is looked upon by the London and Edinburgh Colleges as an impurity; its presence is indicated by the ruddy fumes evolved when the salt is heated; it is often adulterated with red oxide of iron, red oxide of lead, or brick dust; they may be all detected by exposing the salt to a red heat: if pure it is entirely sublimed.

THERAPEUTICAL EFFECTS.—As a mild caustic, this preparation is applied to indolent ulcers, to spongy granulations, to venereal warts, to the eyelids in chronic inflammation of their edges, &c. It may be used in powder or in ointment as follows:—

Unguentum hydrargyri oxydi rubri, D. *Unguentum hydrargyri nitrico-oxydi,* L. *Unguentum oxydi hydrargyri,* E. ("Take of red oxide of mercury, one drachm; ointment of white wax, seven drachms: reduce the oxide to a very fine powder, and mix it intimately with the ointment by trituration," D. "Nitric oxide of mercury, ℥j.; white wax, ℥ij.; prepared lard, ℥vj.; add the oxide in very fine powder to the wax and the lard melted together, and mix intimately," L. "Red oxide of mercury, ℥j.; axunge, ℥viij.; triturate them into a uniform mass," E.).

HYDRARGYRI PERNITRATIS LIQUOR, D.—*Solution of the pernitrate of mercury. Acid nitrate of mercury.*

PREPARATION.—Take of pure mercury, two ounces; pure nitric acid, one fluid ounce and a-half; distilled water, one ounce and a-half: in the acid, first diluted with the water, dissolve the mercury, with the application of heat, and evaporate the solution to the bulk of two ounces and a-half.

A dense caustic solution very much employed latterly, especially on the continent, to destroy malignant ulcerations, particularly when of a cancerous nature, and as a caustic application to lupus, and to ulcers of the cervix uteri. It is best applied by means of a brush or a piece of lint fastened to a bit of whalebone or wood. It has been known, when thus locally applied, to cause salivation: in one instance Breschet states that he witnessed salivation to be produced by a single application to the ulcerated neck of the womb.

POTASSA CAUSTICA, D. POTASSÆ HYDRAS, L. POTASSA, E. *Caustic Potash. Hydrate of potash. Potash.*

PREPARATION.—*Dublin.*—"Take of solution of caustic potash, any convenient quantity: boil it in a silver or bright iron vessel, until its water has been evaporated away, and then raise the temperature until ebullition ceases, and a liquid is obtained which flows like oil. Pour this out upon a silver or iron dish, and the moment it has set, break into fragments, and enclose these in a green-glass bottle furnished with an air-tight stopper." *London.*—"Take of solution of potash, cong. j.; evaporate the water in a clean iron vessel over the fire, until the ebullition being finished the hydrate of potash liquefies. Pour this into proper moulds." *Edinburgh.*—"Take any convenient quantity of Aqua Potassæ, evaporate it in a clean and covered iron vessel, increasing gradually the heat, till there remains an oily-looking fluid, a drop of which when removed on a glass-rod becomes hard on cooling; then pour out the liquid on a bright iron plate, and as soon as it solidifies, break it quickly and put into glass bottles secured with glass stoppers."

PHYSICAL PROPERTIES.—In flat irregular pieces, or more generally in pencils or sticks of various lengths and about the thickness of a writing pen; greyish or bluish; inodorous; having a very acrid alkaline taste. Specific gravity, 1·8.

CHEMICAL PROPERTIES.—Caustic potash is composed of 1 equivalent of potassium, 1 of oxygen, and 1 of water, ($KO + HO$); exposed to the air it deliquesces rapidly, and soon becoming liquid, attracting carbonic acid at the same time, is converted into the carbonate. It is soluble both in water and alcohol, water dissolving nearly an equal weight; during the solution heat is evolved. It possesses the properties of an alkali in an eminent degree.

ADULTERATIONS.—It generally contains various impurities, such as oxide of iron, silica, and sulphates and carbonates of potash; their presence, however, is of little consequence with reference to its medical uses. The iron and silica may be detected by dissolving in water or in alcohol; the sulphates and carbonates by the appropriate tests for sulphuric and carbonic acids.

USES.—Caustic potash is a powerful caustic, but so unmanageable in consequence of its deliquescent property, that it is not often employed. Its chief use is for making an issue, which is effected by covering the part with two or three layers of adhesive plaster, in the centre of which an aperture is cut of the size of the intended issue; the caustic potash is rubbed on the part until the surface is destroyed; a linseed-meal poultice is then applied, and when the slough separates a pea is inserted. Pencils of caustic potash, not deliquescent, may be readily prepared, according to M. Robiquet, by combining it with gutta percha in the following manner. He first reduces the caustic potash to a pulverulent state by exposing it to a red heat until completely melted, pouring on a slate so as to cool it rapidly, then pulverizing in a warmed iron mortar and passing through a wire sieve. This powder must be put at once into a well-stopped bottle. The gutta percha is melted with the lowest possible temperature, that of warm cinders for example, and mixed quickly with its own weight of the powdered caustic potash in a quantity not exceeding 10 to 12 drachms. Should the mixture not be pliable enough, it may be softened by the addition of a few drops of melted wax and mixed anew. It can be then rolled into cylinders, which, previous to use, should be dipped for a few seconds into spirit of wine.

Potassa (Caustica, D.*) cum calce,* D. L. E. ("Take of caustic potash; fresh-burned lime, of each, one ounce: rub them both rapidly to powder in a warm mortar, and introduce the mixture with as little delay as possible into a bottle furnished with an air-tight stopper," D. "Hydrate of potash, and lime, of each, ℥j.; rub together and keep in a well-stopped vessel," L. "Take any convenient quantity of aqua potassæ; evaporate it in a clean covered iron vessel to one-third its volume; add slacked lime till the fluid has the consistence of firm pulp: preserve the product in well-closed vessels," E.). The preparation of the Dublin and London Colleges should be made into a paste with rectified spirit before it is used. For producing issues this preparation is preferred by many to caustic potash, as being more manageable, in consequence of not being so deliquescent.

Caustic of Filhos. This preparation is exceedingly useful for cauterizing the neck of the uterus, and is also very generally employed by French surgeons for many other purposes. Some nicety is required for its formation: tubes of lead from 3 to 4 lines in diameter and from 1 to 2 yards in length, are procured, and divided into portions of a convenient length by means of a piece of cord attached at both extremities to a fixed point, and rolled evenly around the tube where it is wished to cut it. By this method the parietes of the tube are bent inwards, and a small opening only left, which is easily closed by means of a hammer and a mandril introduced into the tube; great care must however be taken that the smallest fissure be not left as this would render the tube useless. The tubes thus prepared are placed in sand or moist clay and filled with the following caustic:—Heat 120 parts of *Potassa cum calce* in a clean iron spoon until it is perfectly fused, when the spoon acquires a dull red heat; and add to it gradually 40 parts of fresh quick lime, stirring with an iron rod, until the whole is intimately mixed. It must be poured while fluid into the tubes. When cold, the parietes of the tubes are thinned with a file as much as possible, care being taken not to penetrate them. These caustic pencils are kept in glass tubes with a little finely powdered quick lime, the orifices being securely closed with corks, a little cotton being placed between the cork and the pencil. More recently M. Robiquet has proposed a much more simple method for preparing these tubes, and his plan has been approved of in a Report to the French Academy of Medicine. The fused caustic is poured into iron moulds, removed as soon as cold, and enveloped in slips of gutta percha paper gently heated to make them adhere, which is readily effected by rolling on a table. The same precaution is requisite in their preservation as when the lead envelopes are used.

Caustic powder of Vienna, (Take of *Potassa cum calce*, 50 parts; quick lime, 60 parts; powder the two substances separately in a warm mortar, and mix them intimately and rapidly; keep in well-stoppered bottles.) When required for use, this powder is made into a soft paste with a little spirit and applied to the part it is wished to cauterize.

In cases of poisoning with caustic potash, the best antidotes are, vinegar, lemon-juice, or the fixed oils.

ZINCI CHLORIDUM, D. L.—*Chloride of zinc. Butter of zinc.*

PREPARATION.—"Take of solution of chloride of zinc, any convenient quantity: evaporate it down in a porcelain capsule, so far, that upon suffering the residual liquor to cool it solidifies. Subdivide the product rapidly into fragments, and enclose them in a well-stopped bottle," D. "Hydrochloric acid, Oj.; distilled water, Oij.; zinc, in small fragments, ℥vij.; mix the acid with the water, add the zinc, and as soon as the effervescence has nearly ceased, apply heat as long as bubbles are given off. Pour off the liquor, strain, and evaporate until a dry salt is left. Melt this in a lightly covered crucible with a nearly red heat, and pour it on a smooth clean stone. As soon as it is cold, break it in pieces, and keep it in a well-closed bottle." L.

PHYSICAL PROPERTIES.—In solid pieces; snow white; inodorous; having a strongly styptic metallic taste.

CHEMICAL PROPERTIES.—Chloride of zinc is composed of 1 equivalent of chlorine, and 1 of metallic zinc, ($ZnCl$); exposed to the air it deliquesces rapidly, being said by many chemists to be the most deliquescent of salts. It is fusible at 212°, and is volatilized at a red heat. It is soluble in water, alcohol, and ether ; the solutions being acid.

ADULTERATIONS.—The following are the characteristics and tests for this salt given in the London Pharmacopœia :—"Colourless ; deliquescent ; soluble in rectified spirit and in water. In the solution in water a white precipitate is occasioned by hydrosulphuric acid or ferrocyanide of potassium. Ammonia and potash give white precipitates which are redissolved when an excess of either is added. But the white precipitates produced by carbonate of ammonia [carbonate of *soda ?*] or carbonate of potash are not soluble on either being added in excess."

USES.—Chloride of zinc is a powerful caustic, destroying the vitality of the part with which it is placed in contact ; the process being attended with violent burning pain which lasts for five or six hours. It has not been so much employed in this country as on the continent, where it is in very general use, for the formation of issues ; to destroy fungous growths, *nœvi materni*, &c. ; and as an application to open cancer, in which disease it is said to be productive of the best effects, by inducing a new action in the neighbouring parts ; it has been also applied to fungus hematodes, and to various forms of malignant ulcerations. Lately, in consequence of the experiments recently carried on in London, which have been alluded to in the general observations at the commencement of this chapter, its efficacy in the destruction of cancerous growths seems to be much better established. In tooth-ache caused by caries, a minute portion of chloride of zinc introduced into the cavity of the tooth, the carious parts having been previously removed with a silver probe, affords almost immediate relief; the neighbouring surface must be protected with lint, and a small portion of lint is to be put into the hollow of the tooth after the chloride has been applied.

It may be used in the form of lotion, prepared by dissolving the salt in distilled water in different proportions—from ʒss. to ʒij. to the ounce—according to the effect required to be produced ; or in the form of paste, made by mixing the chloride with from two to five parts of flour. In applying the paste of chloride of zinc a small space only should be covered with it at a time ; and it should be spread in a layer not thicker than from one to two lines. It may be left on from six to eight hours. Caustic pencils of chloride of zinc may be readily prepared by combining it with gutta percha in a manner precisely similar to that described at page 168 for the preparation of pencils of caustic potash.

ZINCI SULPHAS. *Sulphate of zinc*, (described in the division *Astringents*,) has recently been very highly commended as a caustic by Professor Simpson. He uses it in the anhydrous state and finely levigated, applying it either in the form of powder, of a paste made with glycerine in the proportion of a drachm of glycerine to an ounce of the powder (this paste keeps for any length of time), or of an ointment prepared by pounding together two drachms of prepared lard with one ounce of the powder. Anhydrous sulphate of zinc does not act as a caustic on surfaces when the epithelium is entire or the skin unbroken.

CHAPTER VII.

DIAPHORETICS.

(Sudorifics; Diapnoïcs.)

Medicines which augment the cutaneous exhalation are termed Diaphoretics; when they increase it to such a degree as to cause sweating, they are denominated Sudorifics; but as the same remedies are capable of producing both effects, which differ in degree only, I have included them under the one title. Obstructed perspiration, or diseases in which diaphoresis proves useful, may be associated with fever and inflammation, or may occur with a slow languid circulation: the former is indicated by the morbid heat of the surface of the body, and by increased vascular action; the latter by the coldness of the surface, and by general depression of the circulation. It is evident, therefore, that very different remedies will act as diaphoretics in these opposite states of the system. In the former case, those medicines are to be selected for use, which appear to act by relaxing the morbid constriction of the cutaneous capillaries, and at the same time have a direct tendency to lower the action of the heart and arteries: such as *antimonials*, and the *alkaline* and *saline diaphoretics*. In the latter, those remedies are to be employed which, while they act as stimulants to the cutaneous capillaries, also increase the general action of the vascular system. In addition to the medicines described in this division, other means are resorted to for the production of diaphoresis: the more important of these are increased muscular action, as produced by active exercise; warm water, warm vapour, and warm air baths; the cold affusion; and the use of tepid diluent drinks, for example, water, gruel, whey, &c. During the administration of diaphoretics, it is essential that the surface of the body should be kept warm, and for this purpose a bad conductor of heat, such as flannel, ought to be employed as a covering; care also must be taken to avoid the application of cold, either by exposing the surface of the body to cold air or by the use of cold drinks, while the perspiration continues, or for some time after it has ceased; lastly, when it is wished to check the diaphoresis, this must be done gradually, by drying the surface of the body with warm towels, by diminishing the covering, and by cautiously exposing the hands and arms to the air.

AMMONIÆ ACETATIS LIQUOR, D. L. AMMONIÆ ACETATIS AQUA, E.—*Solution of acetate of ammonia. Mindererus' spirit.*

PREPARATION.—*Dublin.*—"Take of sesquicarbonate of ammonia, in fine powder, two ounces and a half, or a sufficient quantity; dilute acetic acid, three pints: To the acid, introduced into a bottle, gradually add the sesquicarbonate of ammonia to saturation, and dissolve by shaking, but without the aid of heat. The specific gravity of this solution is 1012." *London.*—"Dilute acetic acid, Oj.; sesquicarbonate of ammonia, ʒix. or a sufficiency; add the sesquicarbonate to the acid to saturation." *Edinburgh.*—"Distilled vinegar, from French vinegar in preference, f℥xxiv.; carbonate of ammonia, ℥j.; mix and dissolve the salt; if the solution has any bitterness, add by degrees a little distilled vinegar, till that taste be removed; the density of the distilled vinegar should be 1·005, and that of the aqua acetatis ammoniæ, 1·011."

PHYSICAL PROPERTIES.—A transparent colourless liquid, with a very faint acetous odour, and a cooling saline taste. The specific gravity varies with the strength of the solution, that of Dublin is 1·012, that of Edinburgh, 1·011, and that of London 1·022.

CHEMICAL PROPERTIES.—This is a solution of acetate of ammonia ($NH^4O+C^4H^3O^3$) in water; the proportion of the acetate present varies exceedingly, depending on the strength of the distilled vinegar employed in the preparation. The solution should be perfectly neutral, but is usually faintly acid, which is rather an advantage in relation to its employment in medicine. By careful evaporation crystals of the salt may be obtained, they are very deliquescent. On adding a few drops of sulphuric acid to the solution, an acetous odour is evolved; caustic potash disengages an ammoniacal odour.

ADULTERATIONS.—This solution seldom if ever contains any impurity; the London and Edinburgh Colleges, nevertheless, have given tests for detecting the presence of metallic matter, and sulphuric or hydrochloric acid:—the metals, by sulphuretted hydrogen; and the acids, the former by chloride of barium, the latter by nitrate of silver. The solution should be perfectly colourless, and of the prescribed density. If too long kept, or in bottles badly stoppered, it undergoes decomposition and various flocculent vegetable matters are developed in it.

THERAPEUTICAL EFFECTS.—Water of acetate of ammonia acts as a diaphoretic, with much certainty, and is very generally employed with that intention in febrile and inflammatory affections. Its operation should be promoted by the use of warm drinks and by the surface of the body being kept warm, as otherwise it is apt to pass off by the kidneys. This solution possesses the advantage of not exciting the circulation in any considerable degree, a property which renders it peculiarly adapted for febrile diseases. If prescribed in too large doses it usually acts on the kidneys, and consequently does not produce diaphoresis.

DOSE AND MODE OF ADMINISTRATION.—f℥ss. to f℥j., repeated every fifth or sixth hour.

Diaphoretic mixture, (Solution of acetate of ammonia, f℥ij.; simple syrup, f℥j.; orange flower water, f℥j.; camphor mixture, f℥iv.; mix.) Dose, f℥j. every fourth hour.

INCOMPATIBLES.—Acids ; potash, and soda, and their carbonates; lime water ; nitrate of silver ; acetate of lead ; and the metallic sulphates.

AMMONIÆ CITRATIS LIQUOR, L.—*Solution of citrate of ammonia.*

PREPARATION.—Citric acid, ℥iij. ; distilled water, Oj. ; sesquicarbonate of ammonia, ℥iiss. ; or a sufficiency ; dissolve the acid in the water and add the sesquicarbonate to saturation.

PHYSICAL PROPERTIES.—Solution of the citrate of ammonia is very generally employed in medicine, being usually prepared extemporaneously by the addition of lemon-juice to sesquicarbonate of ammonia dissolved in water ; it has now, however, been introduced into the last edition of the London Pharmacopœia, and the above directions given for its preparation. The solution is transparent and colourless, inodorous, with a mawkish alkaline taste.

CHEMICAL PROPERTIES.—It is a solution of citrate of ammonia $(3NH^4O+C^{12}H^5O^{11})$ in water. This salt cannot be obtained in a solid form, as on the application of heat ammonia is at once driven off from its solution; f℥j. of the officinal preparation contains grs. lxxvii. of anhydrous neutral citrate of ammonia.

It is not liable to adulteration.

THERAPEUTICAL EFFECTS.—Mildly diaphoretic and cooling, and consequently in very general use as a febrifuge. The extemporaneous solution, however, prepared with fresh lemon-juice is much to be preferred, the more especially as the preparation does not keep well, soon undergoing decomposition.

DOSE AND MODE OF ADMINISTRATION.—fʒij. to f℥j. every third or fourth hour.

INCOMPATIBLES.—The acids ; most salts ; and alkalies and their carbonates.

ANTIMONII OXYDUM, D. E.—*Oxide of antimony. Teroxide of antimony.*

PREPARATION.—*Dublin.*—"Take of solution of terchloride of antimony, sixteen fluid ounces ; water, two gallons ; solution of caustic potash, one pint ; distilled water, a sufficient quantity : Pour the antimonial solution into the water, and having stirred the mixture well, set it by until the white precipitate which forms has subsided. Draw off the supernatant liquid by decantation or the syphon, and, having agitated the sediment with a gallon of distilled water, allow the whole to stand till the oxide has fallen to the bottom. Decant again, and having placed the sediment on a calico filter, wash it with distilled water until the liquid which trickles through reddens blue litmus paper only in a very slight degree. The precipitate is now to be shaken occasionally for half an hour, with the solution of caustic potash, and then washed on a filter with boiling distilled water, until the washings cease to give a precipitate on being dropped into an acid solution of nitrate of silver. Lastly, let the product be dried at a heat not exceeding 120°." *Edinburgh.*—"Sulphuret of antimony, in fine powder, ℥iv. ; muriatic acid (commercial), Oj.; water, Ov.; dissolve the sulphuret in the acid with the aid of a gentle heat; boil for half an hour; filter; pour the fluid into the water; collect the precipitate on a calico filter; wash it well with cold water; then with a weak solution of carbonate of soda; and again with cold water till the washings cease to affect reddened litmus paper. Dry the powder over the vapour bath."

PHYSICAL PROPERTIES.—A heavy white powder, sometimes semicrystalline; inodorous, and perfectly tasteless when pure.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of antimony, and 3 of oxygen, ($Sb\ O^3$), Graham. It is permanent in the air, exposed to heat it becomes yellow, and fuses at a red heat, concreting slowly as it cools into a crystalline mass; by a stronger heat it is sublimed in white vapours which condense in the form of crystalline needles. Oxide of antimony is insoluble in water; it is soluble in hydrochloric, tartaric, and acetic acids.

ADULTERATIONS.—Not liable to any; that it has been properly prepared is shown by the tests of the Edinburgh Pharmacopœia: "Entirely soluble in muriatic acid, and in a boiling mixture of bitartrate of potash and water, fusible at a red heat."

THERAPEUTICAL EFFECTS.—Originally introduced into the Dublin Pharmacopœia only for the preparation of tartar emetic; but of late years it has been used as a diaphoretic in the same cases as James' powder. The action of this preparation on the system, which it appears to resemble much, will be explained in the next article.

DOSE AND MODE OF ADMINISTRATION—Gr. iij. to gr. x.; in some instances so large a dose as ʒss. has proved inert, this however may be owing to faulty preparation. It may be given in the form of pill made with conserve of roses.

ANTIMONII PULVIS COMPOSITUS, L. PULVIS ANTIMONIALIS, D. E.—*Antimonial powder.*

PREPARATION.—The process for preparing James' powder, the empirical preparation for which the officinal is intended as a substitute, is a secret with the proprietors of the nostrum; that for antimonial powder is as follows:—*Dublin.*—"Take of tartarized antimony; phosphate of soda, of each, four ounces; chloride of calcium, two ounces; solution of ammonia, four fluid ounces; distilled water, one gallon and a half, or a sufficient quantity: Dissolve the tartarized antimony in half a gallon, and the phosphate of soda and chloride of calcium, each, in a quart of the water. Mix the solutions of the tartarized antimony and phosphate of soda when cold, and then pour in the solution of chloride of calcium, having first added to the latter the water of ammonia. Boil now for twenty minutes, and, having collected the precipitate, which will have then formed, on a calico filter, wash it with hot distilled water until the liquid which passes through ceases to give a precipitate with a dilute solution of nitrate of silver. Finally, dry the product by a steam or water heat, and reduce it to a fine powder." *London.*—"Tersulphuret of antimony, powdered, lbj.; horn-shavings, lbij.; mix and throw them into a crucible red hot in the fire, and stir constantly till vapour no longer arises. Rub that which remains to powder, and put it into a proper crucible; then apply fire, which increase gradually that it may be red hot for two hours. Rub the residue to very fine powder." *Edinburgh.*—"Sulphuret of antimony, in coarse powder; and hartshorn shavings, of each, equal parts; mix and put them into a red hot iron pot, and stir constantly till they acquire an ash-grey colour, and vapour no longer arises. Pulverise the product, and put it into a crucible with a perforated cover, and expose this to a gradually increasing heat till a white heat be produced, which is to be maintained for two hours. Reduce the product when cold to a fine powder."

PHYSICAL PROPERTIES.—A dull white powder, tasteless and odourless; feeling gritty under the teeth in consequence of its being in general rather coarsely powdered, a defect which however does not exist in the Dublin preparation, as it is obtained by precipitation. The empirical preparation, "James' powder," resembles it both in physical and chemical properties, except in being in a state of much more minute division.

CHEMICAL PROPERTIES.—According to the accurate experiments of Dr. Douglas Maclagan of Edinburgh, the composition of both preparations appears to be similar, but the proportions of the different ingredients present vary remarkably in different specimens. They consist of from ½ to 2½ per cent. of the antimonite of lime, and from 4 to 10 per cent. of sesquioxide of antimony; to the presence of both of which, chiefly the latter, the activity of the preparation is due: the remainder being inert antimonious acid, and phosphate of lime. Boiling water dissolves the antimonite of lime which is deposited as the solution cools; hydrochloric acid dissolves the sesquioxide of antimony and the phosphate of lime. Antimonial powder, as prepared by the process of combustion and incineration as directed in the pharmacopœias, is liable to vary much in its nature. To prevent this, Chenevix suggested the preparation of antimonial powder in the moist way, and a modification of his process has been introduced into the last Dublin Pharmacopœia; but in my own experience I have found the compound thus obtained less certain in its effects than that obtained by the old method, and physicians will therefore be still induced to prefer the secret preparation "James' powder," the price of which has been lately much reduced.

Not liable to adulteration; but as before remarked, it varies much in activity.

THERAPEUTICAL EFFECTS.—Antimonial powder and James' powder, though frequently even in very large doses not producing the least apparent effect on the system, more generally operate as powerful diaphoretics, causing copious perspiration without much excitement or disturbance of the circulation. They are generally employed in the early stages of febrile diseases, and in inflammatory affections; they have been also given in chronic skin diseases, and combined with calomel and opium in acute rheumatism. In consequence of the uncertainty of their operation, and the very high price at which the patent nostrum was sold until lately, many practitioners prefer to employ tartar emetic, from which, when administered with proper regulation of the doses, we can obtain a nearly similar action with much greater certainty. The late Dr. Cheyne employed James' powder with excellent effect in the after-treatment of apoplexy, to equalize the circulation and thereby prevent a return of the fit; and his practice has been very generally adopted by the physicians of this city with the most beneficial results. He at first gave two grains for a dose at bed-time and increased it by half a grain every night, until eighteen grains were taken at one dose, unless vomiting or purging were sooner produced.

DOSE AND MODE OF ADMINISTRATION.—In powder, from gr. iij. to gr. x., repeated every four or five hours ; or it may be made into pill with conserve of roses or any of the vegetable extracts. A large dose will produce vomiting in most persons.

ANTIMONII SULPHURETUM, D. E. ANTIMONII TERSULPHURETUM, L.—*Sulphuret of antimony. Crude antimony.*

PREPARATION.—An article of the Materia Medica in the three British Pharmacopœias; prepared by fusing the ore in a perforated crucible placed over another destined to receive the melted mass; the Dublin College directs it to be further purified by the process of levigation and elutriation as for prepared chalk, when it is termed *Antimonii sulphuretum præparatum.*

PHYSICAL PROPERTIES.—In small conical masses or loaves, of a bluish-grey colour, staining the fingers or paper black, with a brilliant, metallic, crystalline fracture ; it is inodorous and tasteless, is easily pulverised, and yields a black powder. Specific gravity, 4·6.

CHEMICAL PROPERTIES.—It is composed of one equivalent of antimony, and 3 of sulphur, ($Sb + 3\,S$), Graham ; is permanent in the air, exposed to a moderate heat fuses, and at a red heat volatilizes. Tersulphuret of antimony is insoluble in water; with the aid of heat it is completely dissolved by hydrochloric acid with the disengagement of sulphuretted hydrogen gas.

ADULTERATIONS.—Although not liable to adulteration, as met with in commerce it contains many impurities ; most of these are detected by dissolving in hydrochloric acid ; but there is one of much importance which this test will not detect, and which is seldom wanting, namely, arsenic : its presence may be shown by the reduction test as before described for arsenic (page 163), the sulphuret having been previously mixed with charcoal and carbonate of soda.

THERAPEUTICAL EFFECTS.—This preparation is scarcely ever used in medicine at present; it was formerly administered as a diaphoretic in doses of from gr. x. to ʒij. in cutaneous and scrofulous diseases, and in gout and rheumatism. It is employed in pharmacy for preparing the other antimonial compounds.

ANTIMONII SULPHURETUM PRÆCIPITATUM, D. ANTIMONII OXYSULPHURETUM, L. ANTIMONII SULPHURETUM AUREUM, E.—*Precipitated sulphuret of antimony. Oxysulphuret of antimony. Golden sulphuret of antimony.* (Syn. *Sulphur antimoniatum fuscum,* D.)

PREPARATION.—*Dublin.*—" Take of prepared sulphuret of antimony, five ounces; carbonate of potash from pearl-ash, first dried by a low red heat, and reduced to powder, four ounces; water, one gallon; pure sulphuric acid, two fluid ounces; distilled water, one quart: Mix the sulphuret of antimony and carbonate of potash in a mortar and heat the mixture in a Hessian crucible, first cautiously until effervescence ceases, and then to low redness, so as to produce liquefaction. Pour out the melted mass on a clean flag, and, when it has concreted and cooled, rub it to a fine powder in a porcelain mortar. Add this, in successive portions, to the gallon of water while boiling in an iron vessel, and, having maintained the ebullition for twenty minutes, transfer the whole to a calico filter, and cause the solution which passes through to drop into the distilled water previously mixed with the sulphuric acid. Let the precipitate which forms be collected on a calico filter, and let warm distilled water be repeatedly poured upon it, until the liquid which passes through ceases to give a precipitate when dropped into a solution of nitrate of barytes. Finally, dry the product on porous bricks placed in a warm atmosphere." *London.*—" Tersulphuret of antimony, powdered, ℥vij.; solution of soda, Oiv.; distilled water, cong. ij.; dilute sulphuric acid, a sufficiency; mix the tersulphuret of antimony, solution of soda and water together; and boil with a slow fire for two hours, frequently stirring, distilled water being often added, that it may fill about the same measure; strain the liquor, and gradually drop into it as much diluted sulphuric acid as may be sufficient to throw down the oxysulphuret of antimony; then wash away the sulphate of soda with water, and dry what remains with a gentle heat." *Edinburgh.*—" Sulphuret of antimony, in fine powder, ℥j.; solution of potash, f℥xj.; water, Oij.; mix the water and solution of potash, add the sulphuret, boil for an hour, filter immediately, and precipitate the liquid while hot, with an excess of diluted sulphuric acid; collect the precipitate on a calico filter, wash it thoroughly with water, and dry it with a gentle heat."

PHYSICAL PROPERTIES.—A soft light powder of a bright orange colour, odourless, and tasteless when pure.

CHEMICAL PROPERTIES.—According to Wittstein its chemical composition is 2 of antimony and 5 of sulphur ($Sb^2 S^5$); in the Edinburgh Pharmacopœia it is stated to be a mixture or compound of sesquisulphuret of antimony, sesquioxide of antimony, and sulphur. When kept in a dark place it is permanent in the air, but if exposed to light and air is slightly decomposed and becomes of a paler colour, some sulphur being set free; heated in close vessels, sulphur is sublimed; but if heated in contact with air, it burns with a greenish-blue flame, evolving sulphurous acid and leaving a greyish residuum. Oxysulphuret of antimony is insoluble in water, and only partially soluble in dilute acids; with the aid of heat it is nearly all dissolved by solutions of the alkalies.

ADULTERATIONS.—This preparation often contains oxide of iron and sulphur, and is frequently coloured with Brazil-wood or red Sanders-wood; all these impurities are readily detected by the tests of the Edinburgh College: "twelve times its weight of pure muriatic acid, aided by heat, dissolve most of it, forming a colourless solution and leaving a little sulphur."

THERAPEUTICAL EFFECTS.—The golden sulphuret of antimony possesses diaphoretic properties, in large doses producing nausea and vomiting; it is seldom employed alone, but in the following preparation is in very general use as a diaphoretic and alterative:—

Pilulæ calomelanos compositæ, D. E. *Pilula hydrargyri chloridi composita,* L. (" Take of calomel, precipitated sulphuret of antimony, of each, one drachm: guaiacum resin, in powder, two drachms; castor oil, one fluid drachm; triturate the calomel with the antimony, then add the resin and oil, and beat the whole into a uniform mass," D. "Chloride of mercury; oxysulphuret of antimony, of each, ʒij.; guaiacum resin, powdered; and treacle, of each, ℥ss.; rub the chloride of mercury with the oxysulphuret of antimony, afterwards with the guaiacum resin and treacle until incorporated," L. "Calomel, and golden sulphuret of antimony, of each, one part; guaiacum, in fine powder, two parts; make into a pill mass with two parts of treacle; to be divided into six-grain pills," E.). This compound is commonly known as *Plummer's Pill;* it is an excellent diaphoretic and alterative, well adapted for some cutaneous eruptions, especially those of a syphilitic origin. Dose gr. v. to gr. x. or gr. xv. About five grains—six grains, L. E.—contain one grain each of calomel and of the golden sulphuret of antimony.

INCOMPATIBLES.—Acids; and acidulous salts.

ANTIMONIUM TARTARIZATUM, D. E. ANTIMONII POTASSIO-TARTRAS, L.—*Tartarized antimony. Tartrate of antimony and potash. Tartar emetic.* (Syn. *Antimonii et potassæ tartras* sive *tartarum emeticum,* D.)

PREPARATION.—*Dublin*—"Take of oxide of antimony, five ounces; white bitartrate of potash, six ounces; distilled water, one quart: rub the bitartrate to a fine powder, and, having carefully mixed with it the oxide of antimony, add a little water, so as to convert the mixture into a thick paste, which should be set by for twenty-four hours. Pour on this the remainder of the water, previously raised to the temperature of 212°, and, having boiled for fifteen minutes, with repeated stirring, in a glass or porcelain vessel, filter through calico, returning the slightly turbid liquid which first passes through, so as to obtain a clear solution. After twelve hours let the solution be decanted from the crystals which will have formed, and boiled down to one-third, when upon cooling, an additional product will be obtained. The salt, after being dried upon blotting paper, without the application of heat, should be preserved in a bottle." *London*—"Tersulphuret of antimony, in very fine powder, ℔j.; sulphuric acid, f℥xv.; bitartrate of potash, ℥x.; distilled water, Ov.; mix the tersulphuret with the acid in an iron vessel. To these placed under a chimney apply a gentle heat, constantly stirring with an iron spatula. Then increase the heat, until the flame of the burning sulphur being extinguished nothing is left but a whitish powdery mass. Wash this when cold with water until all acid is removed, and dry. Mix ℥ix. of this salt intimately with the bitartrate and boil in the water for half an hour. Filter this solution while warm, and set it aside that crystals may be formed; these being removed and dried, let the liquor again evaporate that it may yield crystals." *Edinburgh.*—"Sulphuret of antimony, in fine powder, ℥iv.; muriatic acid (commercial), Oj.; water, Ov.; dissolve the sulphuret in the acid with the aid of a gentle heat; boil for half an hour, filter, pour the liquid into water, collect the precipitate on a calico filter, wash it with cold water, till the water ceases to redden litmus paper; dry the precipitate over the vapour bath. Take of this precipitate, ℥iij.; bitartrate of potash, ℥iv.¼; water f℥xxvij.: mix the powders, add the water, boil for an hour, filter and crystallize by cooling. The mother liquor when concentrated yields more crystals, not so free from colour, and therefore requiring a second crystallization."

PHYSICAL PROPERTIES.—Tartar emetic is met with in the shops either in the form of a white powder, or in transparent colourless crystals, which are octohedrons with a rhombic base. It is inodorous, but has a styptic, nauseous, metallic taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potash, one of teroxide of antimony, one of tartaric acid, and two atoms of water, ($KO, Sb\,O^3, C^8\,H^4\,O^{10} + 2\,HO$). The crystals effloresce in the air, and soon become white and opaque, losing their water of crystallization. Strongly heated the salt is decomposed, and an alloy of antimony and potash is obtained. It is soluble in 14 parts of cold and in 2 parts of boiling water; but is insoluble in alcohol. The solution in water, which is acid, gives *white* precipitates with oxalic and sulphuric acids, caustic potash, and lime-water; *straw coloured* with infusion of nutgalls; and *bright orange-red* with sulphuretted hydrogen or the soluble hydrosulphates; the latter is the most characteristic test.

ADULTERATIONS.—In the crystalline state, this salt is seldom adulterated; in a few instances I have found crystals of sulphate of potash mixed with those of tartar emetic, evidently an intentional fraud, but one easy of detection, as crystals of tartar emetic when dropped into a solution of sulphuretted hydrogen have an orange-coloured deposit formed on them. The powder is very commonly adulterated with cream of tartar, and from being badly prepared frequently contains a large quantity of the oxide of iron; both impurities are readily detected by the tests of the Edinburgh Pharmacopœia: "Entirely soluble in 20 parts of water, solution colourless, and not affected by solution of ferrocyanide of potassium; a solution in 40 parts of water is not affected by its own volume of a solution of 8 parts of acetate of lead in 32 parts of water, and 15 parts of acetic acid." The following are the characteristics and tests given in the London Pharmacopœia for the salt:—"Colourless, soluble in water; the solution is not altered by ferrocyanide of potassium, but a reddish precipitate is produced by hydrosulphuric acid. Chloride of barium or nitrate of silver produces no precipitate, or if any it is redissolved on more water being added. The precipitate occasioned by nitric acid is soluble in an excess of the acid. From 100 grains dissolved in water, hydrosulphuric acid throws down 49 grains of tersulphuret of antimony."

THERAPEUTICAL EFFECTS.—In properly regulated doses, tartar emetic produces diaphoresis more uniformly and more certainly than any other of the antimonial preparations; nausea sometimes accompanies its diaphoretic action, but this is attended with the advantage of placing the system in a condition in which sweating is more freely produced. In all the varities of febrile diseases, especially when a determination of blood to the head forbids the use of the more stimulating diaphoretics, tartar emetic is employed with great benefit. It has been also used with advantage in obstinate cutaneous diseases of an inflammatory character, given in decoction of elm bark or some other tonic if signs of constitutional debility exist. The employment of the antimonial preparations generally is contraindicated in diseases attended with gastric irritation. (See, also, *Epispastics*, *Emetics*, and *Sedatives*.)

DOSE AND MODE OF ADMINISTRATION.—1-12 to 1-6th of a grain frequently repeated; it may be administered dissolved in a large quantity of distilled water, without any flavouring adjunct; thus gr. j. may be dissolved in f℥x. of water, and f℥j. of this taken every hour until sweating is produced; given in the form of pill, however, it is less apt to excite vomiting than when in solution. The following is used as a substitute for James' powder:—Tartar emetic, gr. j.; sulphate of potash, in fine powder, gr. xx.; mix. Dose, gr. ij. to gr. iij., every hour.

Liquor antimonii tartarizati, D. *Vinum antimonii potassio-tartratis*, L. *Vinum antimoniale*, E. ("Take of tartarized antimony, one drachm; distilled water, one pint; rectified spirit, seven fluid ounces: having dissolved the tartarized antimony in the water, and cleared the solution by passing it through a paper filter, add the spirit and preserve the product in a well-stopped bottle," D. "Dissolve gr. xl. of tartar emetic in Oj. of sherry," L. E.) Every fluid ounce contains gr. ij. of tartar emetic. Dose as a diaphoretic, min. xx. to min. xxx., every hour.

INCOMPATIBLES.—The acids; the alkalies, and their carbonates; lime water; chloride of calcium; the earths; some of the metallic oxides; hydrosulphurets; the acetates of lead; corrosive sublimate; decoctions and infusions of most of the bitter and astringent vegetables, as those of cinchona, rhubarb, galls, catechu, &c. The solution in water spoils by keeping.

DULCAMARA, D. L. E. *The twigs*, D. E. (*the young shoots collected in autumn and deprived of their leaves*, L.) *of Solanum dulcamara. Woody nightshade. Bitter-sweet.* — Indigenous, growing in hedges and thickets. It belongs to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Stems, shrubby, twining and branching; Leaves, cordate, upper ones hastate; Flowers, elegant, purple, in drooping clusters; Anthers, large, yellow, united into a pyramidal or cone-shaped figure; Berries, scarlet, juicy.

PREPARATION.—The stems or young shoots are gathered in autumn, when the leaves have fallen off, and dried with the heat of a stove. Those stems of the thickness of a goose-quill are usually selected.

PHYSICAL PROPERTIES.—The twigs, as met with in the shops, are dark-brown externally, white within, light and spongy in the centre; when fresh, they have a faintly nauseous odour, which is lost by drying; the taste is at first bitter, afterwards sweetish, whence the name bitter-sweet is applied to the plant

CHEMICAL PROPERTIES.—According to the analysis of Desfosses, dulcamara contains, besides some salts of lime and potash and other unimportant substances, a peculiar alkaline principle, insoluble in water, soluble in alcohol and ether, pulverulent, inodorous, white, permanent in the air, which he has called *Solania;* it appears to be an acrid narcotic, but its medical properties have not been yet fully examined; its composition is $C^{84}H^{68}NO^{28}$? This alkaloid is found in large quantity in the young shoots of the potato—*Solanum tuberosum;* and is also found in the *Solanum nigrum.* Bittersweet yields its active properties to both water and alcohol.

THERAPEUTICAL EFFECTS.—A decoction and infusion have been employed as diaphoretics in rheumatic and venereal affections, and in chronic diseases of the skin. Its medical properties are generally regarded as being very feeble, and in the present day it is not much used in this country; in my experience, however, the infusion taken in large quantity is an excellent vehicle for the preparations of iodine or of arsenic in obstinate cutaneous affections.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Dulcamaræ,* D. L. E. ("Take of twigs of woody nightshade, dried, half an ounce; water, half a pint: boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D. "Dulcamara, ʒx.; distilled water, Oiss.; boil down to Oj.; and strain," L. "Dulcamara, chopped down, ℥j.; water, f℥xxiv.; mix them, boil and concentrate by evaporation to f℥xvj.," E.). Dose, f℥j. to f℥ij. two or three times a day. The infusion may be prepared of double this strength and infused for four hours.

GUAIACI LIGNUM, D.L.E.—*Wood of Guaiacum officinale. Lignum-vitæ.*

GUAIACI RESINA, D. GUAIACUM, L. E.—*Resin (obtained by heat from the wood,* L. E.) *of Guaiacum officinale.* This tree is a native of Jamaica, of St. Domingo, of many other West India islands, and of British Guiana; it belongs to the Natural family *Zygophyllaceæ,* and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A tree attaining a height of 30 or 40 feet, with a crooked stem, and a hard, heavy wood; Leaves, evergreen, bijugate; Flowers, pale-blue, in clusters in the axillæ of the upper leaves; Fruit, yellow, obovate, coriaceous.

PREPARATION.—The wood is divided into logs or billets. The resin is obtained, as a spontaneous exudation from cracks or fissures in the stem, or by incisions made into it; or artificially procured, by heating one end of billets of wood which have been previously bored lengthwise, until the resin flows out of the opposite extremity; or by boiling the chips and raspings of the wood in a strong solution of common salt, when the resin swims on the surface of the liquid.

PHYSICAL PROPERTIES.—GUAIACUM WOOD, commonly termed Lignum-vitæ, is imported in logs and billets about nine inches in diameter and of various lengths; it is extremely hard, consisting of an outer circle of young wood *(alburnum)* of a pale yellow colour, and a centre of old wood *(duramen* or *heart-wood)* of a dark green colour; its density is 1·333, so that it sinks when thrown into water. For medical use the wood is rasped or shaven into coarse powder *(scobs vel rasura guaiaci)*; in which state it has an acrid resinous taste, and a peculiar aromatic odour. GUAIACUM RESIN is a semi-transparent solid, breaking with a vitreous fracture; the fractured surface varies much in colour, being partly brownish, partly reddish, and partly greenish, but it always becomes green when exposed to the light and air. The odour and taste are similar to, but stronger than those of the wood. The specific gravity is 1·29.

CHEMICAL PROPERTIES.—Guaiacum wood consists of its proper resin, and a peculiar acrid principle, besides gummy matter, mucous extractive, lignin, &c. Its active properties are probably due to the acrid matter as well as to the resin. The latter, the physical properties of which have been described above, as met with in commerce, consists of the true resin—*Guaiacic acid (Guaiacyle)*, with a trace of gum, extractive matter, and woody fibre; it is insoluble in water and in the fixed oils, but is soluble in alcohol and in solutions of the alkalies. The alcoholic solution is precipitated by water and by hydrochloric acid, but not by acetic acid; nitric acid occasions no change at first, but after some hours the liquid becomes green, then blue, and at last a brown precipitate falls down; dropped on flour or on a transverse slice of a potato, a blue colour is produced on exposure to the air. Guaiacum resin is fused by heat. According to M. Deville, its composition is $C^{12}\,H^{8}\,O^{6}$.

ADULTERATIONS.—Various resinous substances are frequently mixed with, or substituted for, guaiacum; the substitution may be readily detected by applying the tests of the Edinburgh Pharmacopœia for the true resin.—"Fresh fracture red, slowly passing to green. The tincture slowly strikes a lively blue colour on the inner surface of a thin paring of a raw potato." The adulteration with colophony or any of the pine resins may be detected by the partial solubility of the suspected article in hot oil of turpentine, which does not act on the true resin. The shavings may be distinguished from those of any other wood by the action of nitric acid, which communicates to them a temporary bluish-green colour.

THERAPEUTICAL EFFECTS.—Guaiacum wood and its resin are stimulating diaphoretics, and are consequently inadmissible in all states of excitement or acute inflammations of the system. They are well adapted for chronic rheumatism of the old or debilitated; for the atonic stages of gout; for chronic diseases of the skin, especially those of a syphilitic origin, or occurring in scrofulous habits; and for all the forms of secondary syphilis, provided there is no irritation or inflammatory tendency in the alimentary canal. When first introduced into the practice of medicine, they were believed to possess anti-venereal virtues, little if at all inferior to mercury. The resin is a constituent of the compound calomel pill (see page 178).

DOSE AND MODE OF ADMINISTRATION.—The resin may be given in powder in doses of from gr. x. to ʒss.; it can be administered in the form of bolus made with treacle or conserve of roses, or suspended in water by means of mucilage. The wood is not administered in powder.

Decoctum Guaiaci, E. (Guaiac turnings, ℥iij; sassafras, rasped, ℥j.; liquorice root, bruised, ℥j.; raisins, ℥ij.; water, Oviij.; boil the guaiac and raisins in the water down to Ov.; adding the liquorice and sassafras towards the close; strain the decoction.) The old *decoction of the woods*, a sudorific in doses of f℥iv., two or three times a day.

Mistura Guaiaci, L. E. ("Guaiacum resin, powdered, ʒiij.; sugar, ℥iss.; gum, powdered, ʒiij.; cinnamon water, Oj.; rub the sugar with the resin and gum, and while rubbing add to them gradually the cinnamon water," L. "Guaiac, ʒiij.; sugar, ℥ss.; mucilage, f℥ss.; cinnamon water, f℥xix.; triturate the guaiac with the sugar, then with the mucilage, and then add gradually the cinnamon water with constant trituration," E.). Dose, f℥ss. to f℥ij., two or three times a day.

Tinctura Guaiaci, D. E. ("Guaiac resin, in fine powder, ℥viij,; rectified spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Guaiac resin, in coarse powder, ℥vij.; rectified spirit, Oij.; digest for 7 days and filter," E.) Dose, fʒj. to f℥ss.; it is decomposed by water, and should therefore be suspended in aqueous vehicles by means of sugar or mucilage.

Tinctura Guaiaci composita, L. *Tinctura Guaiaci ammoniata*, E. ("Guaiacum resin, in coarse powder, ℥vij.; aromatic spirit of ammonia [spirit of ammonia, E.], Oij.; macerate for 7 days and filter.") The best of its officinal preparations. Dose, fʒj. to fʒij., exhibited as the preceding.

Syrupus Guaiaci, AUGUSTIN. (Ammoniated tincture of guaiacum, fʒij.; mucilage; and syrup of almonds, of each, f℥j.; mix.) An elegant formula. Dose, fʒj. to f℥ij. in water.

INCOMPATIBLES.—The mineral acids; and spirit of nitric ether.

IPECACUANHÆ PULVIS COMPOSITUS, D. L. E.—*Compound powder of Ipecacuanha. Dover's powder.*

PREPARATION.—Ipecacuan, in fine powder; and opium, in fine powder, of each, ʒj.; sulphate of potash, ℥j.: mix, L. E. Mix thoroughly by trituration, and pass the powder through a fine sieve, D.

PHYSICAL PROPERTIES.—A brownish-yellow powder, with an opiate odour, and a bitter, saline, slightly acrid taste.

CHEMICAL PROPERTIES.—It is composed of one part each of powdered ipecacuanha and opium, and eight parts of powdered sulphate of potash. The prescriber must bear in mind that in consequence of the change in the weights directed to be employed by the Dublin College, although the proportion in parts remains the same, ʒj. of Dover's powder contains about five and a half, and not six grains each of ipecacuanha and opium. It is insoluble in water or in alcohol. If this powder be kept for any length of time in a bottle without being occasionally shaken, the sulphate of potash sinks to the bottom, and consequently the upper strata will contain more than the proper proportions of the lighter powders—the opium and ipecacuanha: accidents might thus occur in dispensing.

THERAPEUTICAL EFFECTS.—One of the most powerful and most generally employed sudorifics, possessing properties which do not belong to any of its ingredients separately. Its employment is contraindicated in cases attended with irritability of the digestive organs, or where there is cerebral disturbance. It is especially adapted for the milder forms of catarrh, coryza, acute rheumatism, and general dropsy accompanied by suppressed or diminished perspiration, particularly when the urine is albuminous.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx., in pill or in bolus made with conserve of roses. The surface of the body should be kept warm, and as a precaution against vomiting, the patient should not be permitted to drink, for some time after taking the medicine. Every ten grains of Dover's powder contain one grain each of opium and ipecacuanha.

Pilulæ Ipecacuanhæ et Opii, E. (Compound ipecacuan powder, 3 parts; conserve of red roses, 1 part; beat them into a proper mass which is to be divided into gr. iv. pills.) Dose, gr. iv. to gr. viij.

MEZEREON, D. E. MEZEREUM, L.—*The root-bark of Daphne Mezereum.* An indigenous shrub belonging to the Natural family *Thymelaceæ,* and to the Linnæan class and order *Octandria Monogynia.*

BOTANICAL CHARACTERS.—Stem, woody, branching, covered with a smooth greenish-grey cuticle; Leaves, scattered, smooth, lanceolate; Flowers, pale rose colour, highly fragrant, appearing before the leaves, in little tufts on the naked branches; Berries scarlet.

PREPARATION.—Although the Colleges direct the bark of the root to be employed, as met with in the shops it appears to have been removed as well from the branches. The bark is collected in spring, being then most active, and dried with a stove heat.

PHYSICAL PROPERTIES.—The root is generally entire, of various lengths, sometimes branching, covered externally with the bark, which is of a brown colour, smooth and wrinkled; in the centre is the white, hard, tasteless wood; between it and the outer bark is the white and cottony inner bark: the thickness of the root varies from that of a quill to that of the little finger. The bark *(cortex mezerei)* is in pieces of various lengths, quilled, tough and pliable; it is covered with the olive-brown, tasteless epidermis; the true bark is of a greenish-white colour, and fibrous. Mezereon root-bark has a slight nauseous odour; the taste is at first faint, but leaves a hot acrid impression upon the tongue and fauces; in the fresh state the bark has a very acrid taste.

CHEMICAL PROPERTIES.—The inner bark of the mezereon contains a neutral crystalline principle which has been named *daphnin,* and an acrid resin, in combination with wax, sugar, colouring matter, woody fibre, &c. It yields its active principles to water and to alcohol.

ADULTERATIONS.—Various similar barks and roots are either mixed with, or substituted for, mezereon; they may be distinguished by not having the same acrid taste. The woody part, which constitutes the greater portion of the root, is perfectly inert, and consequently should not be employed.

THERAPEUTICAL EFFECTS.—Mezereon is a stimulating diaphoretic, but its properties as such are very feeble in comparison to its acridity, in consequence of which it is not much employed at present. It was formerly in high repute as an efficacious remedy for venereal nodes, and in other forms of secondary syphilis. (See also, *Epispastics.)*

DOSE AND MODE OF ADMINISTRATION.—In decoction, in doses of f℥iv. or f℥v., three or four times a-day.

Decoctum Mezerei, (Mezereon bark, ʒij. ; liquorice root, bruised, ℥ss.; water, f℥xlviij.; boil down to f℥xxxij. and strain.) This decoction has been omitted from the last Dublin Pharmacopœia. Mezereon root-bark enters into the composition of the compound decoction of sarsaparilla.

SARSAPARILLA, D. SARSA, L. SARZA, E. *Root of Smilax officinalis,* D. L., *and probably also of other species,* E. *Sarsaparilla. Jamaica Sarsaparilla,* L. It has been recently asserted by Dr. Seeman that the so called various species of the genus sarsaparilla, from which the medicinal root is obtained, are identical with the Smilax officinalis of Humboldt and Bonplandt which inhabits the warmest regions of South America, especially Peru, Mexico, and the southern parts of Guiana. It belongs to the Natural family *Smilaceæ,* and the Linnæan class and order *Diœcia Hexandria.*

BOTANICAL CHARACTERS.—A diœcious creeper ; Stem, quadrangular, prickly ; Perianth, six parted ; Male flowers, with six stamens ; Female, with a 3-celled ovary, each cell one seeded ; Berry, the size of a cherry, red, 3-celled, containing one to three roundish seeds.

PREPARATION.—The roots are dug up at all seasons of the year, and dried by the heat of the sun. The difference in the appearance of the varieties as imported is stated by Dr. Seeman to be due to the mode of preparing the root.

PHYSICAL PROPERTIES.—Several varieties of sarsaparilla are met with in English commerce; the most important of these are, Jamaica, Honduras, Brazil, and Lima sarsaparilla. They are met with in bundles formed of the folded roots,—in the Brazilian variety the roots are unfolded: the bundles are generally from twenty inches to three feet in length ; the roots consist of a rhizome, *the chump* of druggists, (which, however, is frequently absent), and of numerous rootlets several feet in length, about the thickness of a writing pen, cylindrical, flexible, wrinkled longitudinally, with more or less root-fibres attached to them ; of a reddish-yellow or brown colour externally, the inner bark being rose-coloured and more or less mealy, and the centre *(meditullium)*, woody, whitish and shining. Sarsaparilla has scarcely any odour, the taste is mucilaginous, slightly nauseous, leaving an acrid sensation on the back part of the tongue and fauces. *Jamaica sarsaparilla*, which is most probably the produce of *Smilax officinalis*, has a lively red tint, and more attached root-fibres than the other sorts, whence it is sometimes called *red-bearded sarsaparilla:* it is the most esteemed. *Honduras sarsaparilla* is of a greyish-brown colour, and has but few rootlets attached; the inner bark is so amylaceous, that when the root is rubbed or broken, a white mealy powder is driven out of it; this is the sort generally used in the shops for cutting into chips: it is conjectured by Guibourt to be the root of *Smilax sarsaparilla*. *Brazilian sarsaparilla*, which, according to Martius, is the produce of *Smilax papyracea*, resembles the last in colour and mealiness, but is almost free from rootlets, and the *chump* is not attached. *Lima sarsaparilla* resembles in appearance Jamaica, for which it is often sold, its colour, however, is grayish-brown, and the *chump* is invariably attached, being folded into the centre of the bundle.

CHEMICAL PROPERTIES.—Various analyses have been made of sarsaparilla; it appears to consist of volatile oil, nearly all of which is lost during the process of drying, of a peculiar white crystallizable neutral principle, which has been named *smilacin (paraglin, salseparine, parallinic acid*, of various chemists), acrid bitter resin, lignin, starch, and mucilage. According to Petersen the composition of *smilacin* is $C^{15} H^{13} O^{5}$. Sarsaparilla yields its active properties to boiling water by simple maceration; and the continued boiling to which it is submitted by the directions of the colleges, for preparing the decoctions, the syrup, and the extracts, is not only perfectly useless, but highly injurious, and to this fact may be ascribed the great discrepancy of opinion which exists as to the medicinal properties of the drug.

ADULTERATIONS.—The roots of various allied species which do not possess any medicinal property whatever, are mixed in America with the true sarsaparillas; and in this country the inferior sorts are sold for the finer qualities. The former fraud may be detected by the taste, which is the surest criterion; the latter by attending to the characters of the different species as given above. The characteristics of Jamaica sarsaparilla in the last edition of the London Pharmacopœia are as follows:—"Reddish; thickly beset with radicles; bark, not mealy."

THERAPEUTICAL EFFECTS.—Notwithstanding the little esteem which sarsaparilla is held in by many practitioners, a medicine possessing the great activity that it does in the recent state, as described by Dr. Hancock, can scarcely be inert; unless, as before observed, we destroy its medicinal properties by the pharmaceutical processes to which it is submitted. Under its use, undoubtedly, diaphoresis is frequently produced, and secondary syphilitic affections, especially nocturnal pains, ulcerations of the throat, and cutaneous eruptions have been speedily cured; these effects, however, have been ascribed by many, and I must say with much reason, to the restricted diet to which patients are submitted while undergoing what is called an alterative course. The question of the powers of sarsaparilla in secondary syphilis is worthy of still further investigation, particularly if we consider the high price of the drug, and the great expenditure which its use in hospitals and public charities entails on these institutions; for my own part I consider that its effects have been very much overrated; and in the treatment of cutaneous eruptions, whether of syphilitic origin or not, I very rarely use it now, as I have found by experience that fresh Elm-bark (See *Tonics*) acts with much more certainty. In the first and second editions of this work I expressed the opinion that in any future trials of the efficacy of this medicine, it would be well to use a simple infusion, prepared with boiling water in the same manner and of the same strength as the compound infusion of the Dublin Pharmacopœia of 1826, substituting boiling distilled water for the lime water ordered in that formula; and it will be found that the Dublin College has in its last edition substituted a decoction and compound decoction for those previously contained, in both of which the prolonged boiling has been reduced to a period of 10 minutes.

DOSE AND MODE OF ADMINISTRATION.—In powder the dose is from ʒj. to ʒij.; it is very seldom administered in this form; but if the powder is good, as may be ascertained by the taste, it ought to prove the best mode of giving the medicine; it may be made into a bolus with honey.

Decoctum Sarsaparillæ, D. *Decoctum Sarsæ*, L. *Decoctum Sarzæ*, E. ("Sarsaparilla root, sliced, ℥ij.; boiling water, Oiss.; digest the sarsaparilla with the water for one hour, then boil for ten minutes in a covered vessel, cool and strain. The product should measure a little more than a pint," D. "Sarsaparilla, ℥v.; distilled water, Oiv.; boil down to Oij. and strain," L. "Sarsaparilla chips, ℥v.; boiling water, Oiv.; digest the root in the water for two hours at a temperature somewhat below ebullition; take out the root, bruise and replace it; boil down to Oij.; then squeeze and strain the decoction," E.). Dose, fʒiv. to f℥viij., three or four times a day. The Dublin preparation should be preferred.

Decoctum Sarsaparillæ (Sarsæ, L., *Sarzæ*, E.*) compositum*, D.L.E. ("Take of Sarsaparilla root, sliced, two ounces; sassafras root, in chips; guaiacum wood turnings; liquorice root, bruised, of each two drachms; mezereon root bark, one drachm; boiling water, one pint and a-half. Digest all the ingredients with the water, in a covered vessel, for one hour, then boil for ten minutes, cool and strain. The product should measure a little more than a pint," D. "Decoction of sarsaparilla, boiling, Oiv.; sassafras, sliced; guaiac wood turnings; bruised fresh liquorice root, of each, ʒx.; mezereon, ʒiij.; boil for a quarter of an hour, and strain," L. "Decoction of sarsaparilla, boiling hot, Oiv.; sassafras chips; guaiac turnings; and bruised liquorice root, of each, ʒx.; mezereon, ʒiv.; boil for 15 minutes and strain," E.). The old *decoction of sweet woods;* Dose, f℥iv. to f℥vj., three or four times a-day

Extractum Sarsaparillæ fluidum, D. *Extractum Sarsæ liquidum*, L. *Extractum Sarzæ fluidum*, E. ("Take of Sarsaparilla, one pound; boiling water, eight pints; rectified spirit, as much as is sufficient. Digest the sarsaparilla in five pints of the water for two hours, at a temperature near 212°, and then decant. Add the rest of the water, digest again for two hours, and decant. Evaporate the mixed liquors by a steam or water heat to the consistence of a thin syrup, and, when the product has cooled, add as much rectified spirit as will make the entire twenty ounces," D. "Sarsaparilla, ℔iiiss.; distilled water, cong. v.; rectified spirit, f℥ij.; boil down the sarsaparilla in cong. iij. of the water to Oxij.; pour off the liquor and strain while hot. Boil down the sarsaparilla again in the remainder of the water to one half, and strain. Evaporate the mixed liquors to f℥xviij., and when cold add the spirit," L. "Sarsaparilla chips, ℔j.; boiling water, Ovj.; digest the root for 2 hours in 4 pints of the water, take it out, bruise and replace it, and boil for 2 hours; filter and squeeze out the liquor; boil the residue in the remaining 2 pints of water, and filter, and squeeze out this liquor also; evaporate the united liquors to the consistence of syrup; add, when the product is cool, as much rectified spirit as will make in all f℥xvj.—This fluid extract may be aromatized with volatile oils or warm aromatics," E.). The fluid extract of the Dublin Pharmacopœia is a judicious substitute for that contained in the former edition; those of the London and Edinburgh Pharmacopœias must be inert preparations from the prolonged boiling to which they are submitted. The fluid extract is used as an adjunct to the decoction, or taken diluted with water. Dose, f℥ss. to f℥j.

Syrupus Sarsæ, L. *Syrupus Sarzæ*, E. ("Sarsaparilla, ℔iiiss; distilled water, cong. iij.; sugar, ℥xviij.; rectified spirit, f℥ij.; boil down the sarsaparilla in cong. ij. of the water to cong. j.; pour off the liquor and strain while hot; boil pown the sarsaparilla again in the remainder of the water to one half and strain. Evaporate the mixed liquors to Oij. and dissolve the sugar in them. Finally, when cold, add the spirit," L. "Sarsaparilla chips, ℥xv.; boiling water, cong. j.; sugar, ℥xv.; infuse the sarsaparilla in the water for 24 hours; boil down to Oiv., and strain the liquor while hot; add the sugar, and evaporate to the consistence of syrup," E.). When well prepared its flavour is very agreeable. Dose, f℥iv. to fʒvj., diluted with water, or as an adjunct to the decoction.

INCOMPATIBLES.—Lime-water; and the acetates of lead.

SASSAFRAS, D.L.E.—*The root of Sassafras officinale.* *Sassafras.* This tree, which is a native of North America, belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia.*

BOTANICAL CHARACTERS.—A tall straight tree; with alternate, caducous leaves, of a lucid green colour; Flowers, diœcious, yellow, appearing before the leaves; Berry succulent, of a rich blue colour.

PREPARATION.—The root is dug up at all periods of the year and cut into billets, in which form it is imported into Britain; the volatile oil is obtained from it by distillation.

PHYSICAL PROPERTIES.—Sassafras root is imported in various sized, branched, pieces or logs, covered with a reddish-brown bark which is often partially stripped off; the wood is of a reddish-yellow colour, light and very porous; it has an aromatic agreeable odour, somewhat resembling fennel, and a warm aromatic taste, both of which are dependent on the presence of volatile oil, which is officinal in the Edinburgh Pharmacopœia and was formerly so in that of Dublin. The odour and taste of the bark are stronger than of the wood. The volatile oil, which is of a pale-yellow colour, and heavier than water, when exposed to a low temperature deposits very large and beautiful crystals, measuring 1½ inch on the side; its composition is $C^{10}H^{5}O^{2}$: it is scarcely soluble in alcohol.

CHEMICAL PROPERTIES.—Sassafras wood and bark have been recently analysed by Reinsch: the latter is much the more active. It contains a peculiar principle which he has named *sassafrid*, and which bears much resemblance to tannic acid, a light and heavy volatile oil, camphoraceous matter, tannin, and other unimportant matters. The medicinal virtues are extracted by both water and alcohol.

THERAPEUTICAL EFFECTS.—A stimulating diaphoretic, but its powers as such are so uncertain that it is never prescribed alone. The wood forms a constituent of the *compound decoction of sarsaparilla*, and of the *decoction of guaiacum*, but the boiling to which these preparations are submitted, by the direction of the London and Edinburgh Colleges, must completely dissipate the volatile oil, the active principle of the sassafras.

DOSE AND MODE OF ADMINISTRATION.—It may be given in the form of infusion, prepared by infusing ℥j. of the chips in Oj. of boiling water for an hour, of which f℥ij. may be taken three or four times a day.

Oleum Sassafras, E. (Prepared according to the general direction for volatile oils.) But seldom used; it is an aromatic stimulant in doses of min. ij. to min. x.

CHAPTER VIII.

DIURETICS.

DIURETICS are medicines which augment the secretion and promote the discharge of urine. These effects are produced in a very different manner by different substances; some acting as direct stimulants to the secreting vessels of the kidney, being taken into the current of the circulation and carried without undergoing any decomposition *in transitu* to the urinary organs; others are partially acted on by the digestive organs, and some of their component parts thus eliminated are carried by the circulation to the kidneys, which are thereby stimulated to increased action; while a third class of substances acts primarily on the stomach, the action they excite being secondarily communicated by sympathy to the urinary organs. In whatever manner the action of diuretics is produced, the general effect is to diminish the watery part of the blood, and by this means promote indirectly the absorption of fluid effused into any of the cavities or into the meshes of the areolar membrane. Hence, dropsy is the disease in which they are principally employed, and when the discharge of urine can be excited by their administration, the effused fluid is in general removed more speedily from the system and with less injury to the patient than by any other method. But they are most uncertain in their operation, and it often happens that, although the discharge of urine is much augmented, the dropsical swellings are not removed. The action of diuretics is much modified by the state of the skin, and it therefore frequently occurs that if the surface of the body be excited by external warmth after the administration of a diuretic, its action will be diverted from the kidneys to the vessels of the skin, and diaphoresis be occasioned. A cathartic action seems also to be, to a certain extent, incompatible with diuresis, and consequently some remedies, as cream of tartar, various salts, oil of turpentine, &c., which, if given in small doses properly regulated, increase remarkably the urinary discharge, when administered in larger doses so as to act on the bowels, will occasion scarcely any apparent influence on the functions of the kidneys. A rule originally promulgated by the disciples of the Liebig school of chemists has been very generally adopted, that when any of the saline diuretics are administered, they should be given in a state of great dilution, on the principle that if the solution in which they are prescribed be not of a lower specific gravity than the urine, it would fail to produce diuresis. I cannot, however, agree with this proposition, as experience has led me, more particularly in the treatment of dropsies, to place most confidence in diuretic medicines exhibited, so to say, in rather concentrated solution; a practice I was first led to adopt from considering that saline diuretics, when so administered, require for their elimination by the kidneys a greater amount of the fluids of the system than if they were taken in a diluted state; the demand thus created must be supplied at the expence of the serum of the blood, and the therapeutical action of the medicine is thereby manifestly increased. The most important rules to be attended to in the exhibition of the remedies of this class, are to keep the surface of the body cool, and as soon as the action of the diuretic has commenced, to promote its operation by the use of diluent drinks. Diuretic medicines, when applied to the surface of the body in the form of liniment, or concentrated tincture, or infusion, will in some cases act with much certainty even after they have failed to produce diuresis when given by the mouth; this mode of employing them may be consequently had recourse to in some cases with advantage.

ÆTHEREUS NITROSUS SPIRITUS, D. SPIRITUS ÆTHERIS NITRICI, L. E.—*Nitrous ethereal spirit. Hyponitrous ether with (four volumes of,* E.) *rectified spirit. Spirit of nitric ether. Sweet spirits of nitre.*

PREPARATION.—*Dublin.*—Take of rectified spirit, two pints and eight fluid ounces; pure nitric acid, three fluid ounces; water, one ounce; solution of ammonia, a sufficient quantity. Place six ounces of the spirit in a glass matrass capable of holding a quart, and connect this with a Liebig's condenser, whose further extremity is fitted loosely by a collar of tow into a thin eight-ounce phial. Add now the water to the nitric acid, and, having introduced half of the resulting solution into the matrass, through a safety syphon tube, close the mouth of this tube with a cork, and apply for a few moments a gentle heat, so as to cause a commencement of ebullition. When the *action* (which shortly after commencing, proceeds with much violence, and should be moderated by the external application of cold water) has relaxed, introduce gradually the remainder of the acid, so as to restore it. The action having entirely ceased, agitate the distilled product with half its bulk of the solution of ammonia, allow the mixture to rest for a few minutes, and, having separated the supernatant ethereal liquid, mix four ounces of it with the rest of the spirit, and preserve the product in small, strong, and accurately stopped bottles. In the performance of the previous distillation, the condenser should be fed with ice-cold water, and the phial in which the distilled liquid is received, should be surrounded by a mixture of one part of salt and two of pounded ice; or, when ice cannot be procured, with a mixture of eight parts of sulphate of soda in small crystals and five of commercial muriatic acid." *London.*—" Rectified spirit, Oij.; nitric acid, f℥iiiss.; add the spirit to the acid gradually and mix; then distil f℥xxviij." *Edinburgh.*—" Rectified spirit, Oij. f℥vj.; pure nitric acid (D. 1500), f℥vij. ; put f℥xv. of the spirit with a little clean sand into a two-pint matrass, fitted with a cork, through which are passed a safety tube terminating an inch above the spirit, and another tube leading to a refrigeratory ; the safety tube being filled with pure nitric acid, add through it gradually fʒiiiss. of the acid. When the ebullition which slowly rises is nearly over, add the rest of the acid gradually, fʒss. at a time, waiting till the ebullition caused by each portion is nearly over before adding more, and cooling the refrigeratory with a stream of water, iced in summer. The ether thus distilled over being received into a bottle, it is to be agitated first with a little milk of lime till it ceases to redden litmus paper, and then with half its volume of a concentrated solution of muriate of lime. The pure hyponitrous ether thus obtained, which should have a density of ·899, is then to be mixed with the remainder of the spirit, or exactly four times its volume. Spirit of nitric ether ought not to be kept long, as it always undergoes decomposition, and becomes at length strongly acid." Its density by this process is ·847.

PHYSICAL PROPERTIES.—A transparent, colourless or pale yellow liquid, with a peculiar fragrant, ethereal, odour, and a pungent, sweetish, acidulous taste.

CHEMICAL PROPERTIES.—This preparation is a mixture of hyponitrous ether and alcohol in variable proportions. It is very volatile, producing much cold during its evaporation ; and is very inflammable, burning with a whitish flame. It mixes with alcohol and water in all proportions. By keeping, it gradually becomes acid.

ADULTERATIONS.—Spirit of nitric ether often contains free nitrous acid, probably from being too long kept. It is moreover not uncommonly adulterated with water and with alcohol ; the tests of the Edinburgh Pharmacopœia readily detect these impurities.—" Density, ·847. It effervesces feebly or not at all with solution of bicarbonate of potash ; when agitated with twice its volume of concentrated solution of muriate of lime, twelve per cent. of ether slowly separate." The following are the characteristics and tests for it given in the last edition of the London Pharmacopœia :—" Specific gravity, ·834. It reddens litmus paper slightly. No bubbles of carbonic acid are given off on the addition of carbonate of soda."

THERAPEUTICAL EFFECTS.—This preparation operates as a mildly stimulating diuretic, and with such intention is administered in dropsical affections especially when occurring in children. It is most generally employed as an addition to other remedies of this class, as digitalis, squill, &c., the diuretic operation of which it renders more certain. Spirit of nitric ether sometimes fails to act on the kidneys, when it generally promotes the cuticular secretion, and consequently is frequently employed with benefit in combination with the water of acetate of ammonia in the early stages of febrile diseases. Christison states that as a diuretic he has found sweet spirits of nitre " least serviceable in dropsy connected with diseased kidney, and most useful in the form associated with diseased heart."

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒij. or fʒiij. every second or third hour, it is best given in water or in camphor mixture.

Diuretic potion, SWEDIAUR. (Spirit of nitric ether ; and vinegar of squills, of each, f℥j. ; infusion of juniper, f℥iij. ; compound spirit of horse-radish ; and syrup of ginger, of each, f℥ij. ; mix.) Dose, f℥j., two or three times a-day in water.

INCOMPATIBLES.—Sulphate of iron ; alkaline and earthy carbonates ; and tincture of guaiacum.

BALSAMUM CANADENSE, E.—*Canada-balsam. Liquid resin of Abies balsamea.* A native of the coldest regions of North America ; belonging to the Natural family *Coniferæ (Pinaceæ,* Lindley), and to the Linnæan class and order *Monœcia Monadelphia.*

BOTANICAL CHARACTERS.—An elegant tree ; Stem about 40 feet high ; Leaves, solitary, flat, sub-erect above ; Cones, erect on the branches, large, nearly cylindrical ; of a beautiful, deep glossy colour, fragrant as well as the leaves.

PREPARATION.—The resinous exudation improperly termed balsam is obtained either from little vesicles which form on the bark, or by making incisions quite through the bark into the wood, and collecting the juice as it exudes.

PHYSICAL PROPERTIES.—When fresh it is of the consistence of honey, but it gradually concretes into a yellow, translucent, resinous looking mass ; of a peculiar, agreeable, terebinthinate odour, and an acrid, rather nauseous taste.

CHEMICAL PROPERTIES.—Canada balsam consists of volatile oil, two resins—one soluble the other insoluble in alcohol, extractive, and some salts. It is insoluble in water, but forms an emulsion with it by means of mucilage or yolk of egg.

THERAPEUTICAL EFFECTS.—The action of Canada turpentine on the urinary organs is similar to that of the other turpentines; it is more generally preferred for the treatment of the advanced stages of gonorrhœa, of gleet, of leucorrhœa, and of cystirrhœa, in which diseases it proves highly beneficial.

DOSE AND MODE OF ADMINISTRATION.—Gr. xx. to ʒss. three or four times daily ; if liquid it may be made into pills with magnesia or powdered liquorice root, or it may be given in emulsion with yolk of egg or mucilage ; if solid it may be swallowed entire rolled up in a little sugar.

BUCHU, D.L. BUCKU, E.—*Buchu or Bucku. Leaves of Barosma crenata,* D. *Leaf of Barosma serratifolia, Barosma crenulata and Barosma crenata,* L. *Leaves of various species of Barosma,* E. The various species of the genus Barosma, formerly named Diosma, from which the buchu of commerce is obtained, are natives of the Cape of Good Hope ; and are placed in the Natural family *Rutaceæ,* and in the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Small shrubs, with opposite, smooth, dotted leaves, and stalked axillary flowers ; all the species have a heavy odour.

PHYSICAL PROPERTIES.—As it occurs in commerce at present, buchu consists almost entirely of the leaves of *Barosma serratifolia* mixed with a small quantity of the white flowers; but a few years since, as described in the first edition of this book, it was composed of various species, two in particular, *Barosma crenata* and *Barosma crenulata*, intermixed with broken stalks and seed vessels. The leaves are smooth and shining, dotted with glands containing essential oil; they are of a pale yellowish-green colour, have a heavy aromatic odour resembling a mixture of rue and peppermint, and an aromatic taste leaving a sense of coldness on the mouth.

CHEMICAL PROPERTIES.—Buchu leaves consist of volatile oil (upon which their medicinal properties chiefly depend), gum, resin, extractive, &c. They yield their virtues to water and to alcohol. The volatile oil is of a yellowish-brown colour, lighter than water, and of the same odour as the leaves; the extractive has been named *Diosmin*.

THERAPEUTICAL EFFECTS.—Buchu is a stimulating diuretic; the volatile oil is taken into the circulation, and communicates its odour to the urine soon after it has been swallowed. Independently of its stimulating the kidneys to increased action, it seems to act as a direct tonic to the mucous membrane of the urino-genital organs; thus, it is found most useful in chronic mucous discharges from the bladder and urethra, in diseased prostate, in irritability of the bladder, and in some forms of incontinence of urine. In my experience it is one of our most valuable diuretics in cases where no immediate powerful action on the kidneys is requisite; thus it is especially valuable in the many derangements of the digestive organ attended with deficient secretion of urine and deposit of lithates; and constitutes a useful adjunct to other remedies in obstinate cutaneous affections. At the Cape of Good Hope the powdered leaves are used as a vulnerary, and a spirit distilled from them is employed in dyspeptic affections.

DOSE AND MODE OF ADMINISTRATION.—In powder, (a bad form), ℈j. to ʒss.

Infusum Buchu, D. L. *Infusum Bucku*, E. ("Buchu leaves bruised, ℥ss.; boiling water, Oss.; infuse for one hour in a covered vessel and strain. The product should measure about eight ounces," D. "Buchu, ℥j.; boiling distilled water, Oj.; macerate for four hours in a covered vessel and strain," L. "Bucku, ℥j.; boiling water, Oj.; infuse for two hours in a covered vessel and strain through linen or calico," E.). Dose, f℥j. to f℥ij.

Tinctura Buchu, D. E. ("Buchu leaves bruised, ℥v.; proof spirit, Oij.; macerate for 14 days, strain, express and filter," D. "Bucku, ℥v.; proof spirit, Oij.; digest for seven days; pour off the clear liquor and filter. This tincture may be also made quickly and conveniently by percolation," E.). Dose, fʒj. to fʒiij., in any convenient vehicle.

INCOMPATIBLES.—The sesquisalts of iron; and the astringent vegetables.

CAMBOGIA.—The diuretic properties of gamboge have been noticed at page 105, and a formula given for its administration ; it is not used in this country as a diuretic, although an excellent purgative in dropsical cases, and when given with that intention I have found it promote the operation of medicines of this class.

CANTHARIS, L. E. CANTHARIS VESICATORIA, D. LYTTA, D.—*Cantharis vesicatoria, the whole fly. Cantharides. Spanish flies.* This, the *Meloë vesicatorius* of Linnæus, belongs to the class *Insecta*, and to the order *Coleoptera.* It is a native of the middle and southern parts of Europe, and has been also met with, but rarely, in England. It frequents the ash, the privet, the lilac, and the honeysuckle, and is also found on the elder, the rose, the plum, the elm, and the poplar, upon the leaves of which trees the insect feeds. In the month of June, cantharides are collected in the south of Europe. In the morning, before the rising of the sun, while the insects are still torpid from the moisture of the night, men, whose faces and hands are covered with masks and gloves, having spread a cloth upon the ground, shake the tree violently; the insects fall into the cloth, are immediately gathered in sieves, and are killed by exposure to the vapour of vinegar or preferably by being placed for a short time in an air-tight vessel ; they are then dried in stoves. When perfectly dry, cantharides are immediately put into air-tight boxes, containing a little sulphate of lime or camphor, the former to keep them dry, and the latter to preserve them from the attacks of mites and other insects by which they are devoured. Of late years most of the cantharides employed in medicine are collected in Southern Russia, whence they are exported to Germany, France, England, and America.

PHYSICAL PROPERTIES.—Each cantharis is from six to ten lines long, and about a grain and a-half in weight ; it has two wing covers or elytræ, long, flexible, of a golden-green colour ; two membranous, transparent wings, inferior, folded ; antennæ, black, filiform, longer than the head ; and a longitudinal furrow along the head and neck. Cantharides have a faint disagreeable odour, and a resinous, very acrid taste. They are readily reduced to powder, which even in the finest state presents numberless glistening green particles of the elytræ ; this is their most distinguishing characteristic, Orfila having recognised them in the human stomach nine months after interment.

CHEMICAL PROPERTIES.—Cantharides consist of a white crystalline substance named *cantharidine*, of a yellow-fat oil, a concrete green oil, a yellow viscid substance, a black substance, osmazome, uric, acetic, and phosphoric acids, and some salts. Its active properties are due to the cantharidine, which may be obtained by acting on the powder with rectified spirit, distilling off the spirit and crystallizing ; it occurs in the form of white, micaceous scales, is odourless and tasteless, very volatile even at the ordinary temperature, soluble in alcohol, chloroform, ether, and the fixed and volatile oils, but when pure insoluble in water. The chemical composition of cantharidine is $C^{10}H^{6}O^{4}$. It is a very active poison, and produces immediate inflammation of the skin wherever it comes in contact with it. Cantharidine, according to Farines, exists only in the trunk and soft parts of the body of the fly, and the head, antennæ, elytræ, wings and legs are inert, or nearly so.

ADULTERATIONS.—By the characters given above, cantharides may be distinguished from other insects which resemble them, and are said to be frequently mixed with them on the Continent. They are best protected from the attacks of mites, which destroy their activity, by keeping them in well-stoppered bottles and adding a few drops of strong acetic acid (Pereira), or a few grains of camphor which I have found very effectual. In powder they are not unfrequently adulterated with euphorbium, a fraud which may be easily detected by boiling the suspected powder in a water-bath, with proof-spirit, and filtering while hot; if any euphorbium is present, the decoction on cooling will deposit this gum-resin. The rich glistening colour of the Russian cantharides is said to be due to their being steeped in oil, a process by which their weight is fraudulently increased.

THERAPEUTICAL EFFECTS.—The most important medicinal property of the Spanish fly is its vesicating power, which will be considered hereafter, (See, *Epispastics*). In large doses it is a powerful irritant poison; in small or medicinal quantities it acts as a stimulant to the urino-genital organs, generally causing diuresis and exciting the venereal appetite; but according to Christison, the latter effect is not produced unless it be taken in poisonous doses. As a diuretic, cantharides are not much used in consequence of the dangerous symptoms which sometimes arise even from small doses, yet they often prove the most effectual diuretic in dropsy dependent on disease of the heart. Those who have employed them state that they prove beneficial also in incontinence of urine caused by paralysis of the neck of the bladder, and when it occurs in young persons during sleep. They have been highly praised by many as a remedy for gleet, leucorrhœa, and chronic mucous discharges from the urinary organs; and have been used empirically in hooping-cough.

DOSE AND MODE OF ADMINISTRATION.—Cantharides are seldom employed internally in the form of powder; the dose is gr. ss. to gr. ij. made into pill with extract of liquorice or conserve of roses.

Tinctura Cantharidis, D. L. E. ("Spanish flies in coarse powder, ʒss.; proof spirit, Oij.; macerate for 14 days, strain, express and filter," D. "Cantharides, bruised, ʒiv.; proof spirit, Oij.; macerate for seven days, express and strain," L. "Cantharides, ℥ss.; proof spirit, Oij.; digest for seven days, express strongly the residuum and filter the liquor. This tincture may be obtained more conveniently and expeditiously by percolation, provided the cantharides be reduced to coarse powder, and left with a little of the spirit in the state of pulp for 12 hours before the process of percolation is commenced," E.). Dose, min. x. gradually increased to min. xl.; it should be given in at least an ounce of some emulsion, or of decoction of linseed or barley.

In cases of poisoning with cantharides, we are not acquainted with any antidote; but emetics, emollient and mucilaginous drinks, bloodletting general and local, opiates by the mouth and rectum, and general antiphlogistic treatment should be resorted to.

DIGITALIS PURPUREA, D. DIGITALIS, L. E.—*The leaves (fresh and dried stem leaves of the wild herb,* L.) *of Digitalis purpurea. Foxglove.* An indigenous, biennial plant; belonging to the Natural family *Scrophulariaceæ,* and to the Linnæan class and order *Didynamia Angiospermia.*

BOTANICAL CHARACTERS.—Stem erect, three to four feet high, with a purplish hue; Leaves, large, veiny, ovato-lanceolate, crenate, downy, purplish on their under surface; Flowers, numerous, purple, spotted within, drooping, in very long spikes.

PREPARATION.—The leaves are gathered in the months of June and July, just before the plant comes into flower, and the mid-rib and stalk removed; they are dried with stove heat, in a dark place. The seeds which should be gathered when fully ripe, are very seldom employed now in this country, and consequently have been omitted from the last edition of the London Pharmacopœia.

PHYSICAL PROPERTIES.—The dried leaves of digitalis when properly preserved, are of a bright-green colour, they have scarcely any odour, but the taste is nauseous and acrid.

CHEMICAL PROPERTIES.—They consist of volatile oil, a concrete flocculent volatile matter, fatty matter, extractive, tannin, &c., and a peculiar principle recently discovered by M. M. Homolle and Quevenne, and named by them *digitaline:* this will be described in the chapter on *Sedatives.* The leaves yield their active properties to water, alcohol, ether, and the weak acids. The sesqui-salts of iron produce a dark, and solution of gelatin a white flaky precipitate with infusion of digitalis, indicating the presence of tannin.

ADULTERATIONS.—The leaves of several species of Verbascum are often offered for sale for those of digitalis; the botanical characters should therefore be attended to. The powder ought to be of a fine green colour, and possess the acrid taste of the fresh plant.

THERAPEUTICAL EFFECTS.—Digitalis, in small doses gradually augmented, operates as a special stimulant to the kidneys, increasing the secretion of urine; in somewhat larger doses, or when its use is continued for a longer period, it acts as a *sedative* to the vascular system, (See, *Sedatives*). As a diuretic in the various forms of dropsy, digitalis has acquired a high reputation, but later experience has shown that it proves most serviceable in those cases of dropsical effusion which take place into the areolar membrane of the extremities and of the face, and which depend on diseases of the heart, of the kidneys, or of the liver. It is also better adapted as a diuretic for persons of a weak or enfeebled habit of body, than for the strong or the robust ; and should any inflammatory symptoms be present, antiphlogistic treatment should be had recourse to before employing digitalis. The diuretic action of foxglove is much promoted by combining it with other remedies of this class, as squill, juniper, the diuretic salts of potash, &c., or with small doses of calomel ; when there is much debility present, preparations of iron are advantageously prescribed in conjunction with it.

DOSE AND MODE OF ADMINISTRATION.—Of the powder, gr. ss. every six hours, its operation being aided by the use of diluents, and the surface of the body being kept cool ; administered thus, it generally produces a copious flow of urine after the fifth or sixth dose.

Infusum Digitalis, D. L. E. ("Foxglove leaves, dried, ʒj. ; boiling water, f℥ix. ; infuse for one hour in a covered vessel and strain. The product should measure about f℥viij.," D. "Digitalis, dried, ʒj. ; spirit of cinnamon, f℥j. ; boiling distilled water, Oj. ; macerate the digitalis in the water for four hours in a covered vessel and strain ; then add the spirit," L. "Digitalis, dried, ʒij. ; spirit of cinnamon, f℥ij. ; boiling water, f℥xviij. ; infuse the digitalis for four hours in a covered vessel, strain through linen or calico, and add the spirit," E.) This is the best preparation of digitalis ; the dose is f℥ij. to f℥ss., every six hours. The infusion prepared with double the quantity of digitalis, and applied to the surface of the abdomen in ascites, or to the legs in anasarca, by means of spongiopiline or flannel covered with oil-silk, in some cases produces a diuretic action, when the medicine administered by the mouth fails to do so. This external employment of digitalis as a diuretic, however, notwithstanding it has been lately much used and favourably reported of on the Continent, is in my experience very uncertain in its action.

Tinctura Digitalis, D. L. E. ("Foxglove leaves, dried and in coarse powder, ℥v. ; proof spirit, Oij. ; macerate for 14 days, strain, express and filter," D. "Digitalis, dried ℥iv. ; proof spirit, Oij. ; macerate for seven days, express and filter," L. "Digitalis, dried, in moderately fine powder, ℥iv. ; proof spirit, Oij. ; this tincture is best prepared by percolation, as directed for tincture of capsicum : if f℥xl. of spirit be passed through, the density is ·944, and the solid contents of a fluid ounce amount to gr. xxiv. ; it may be also made by digestion," E.). This tincture, if well prepared, has a greenish colour when viewed by transmitted light. Dose min. xx., three times a day ; it may be given in f℥j. of decoction of broom-tops, combined with sweet spirits of nitre, and compound spirit of juniper.

Pilulæ Digitalis et Scillæ, E. (Digitalis ; and squill, of each, one part ; aromatic electuary, two parts ; beat into a proper mass with conserve of red roses, and divide into four-grain pills.) An excellent diuretic pill ; Dose, one pill every five or six hours.

INCOMPATIBLES.—Sulphate, and tincture of the muriate of iron ; the preparations of cinchona bark ; and the acetates of lead.

JUNIPERUS COMMUNIS, CACUMINA, FRUCTUS (BACCÆ, D.) ET OLEUM, D. E. JUNIPERUS COMMUNIS, FRUCTUS ET OLEUM ANGLICANUM, L.—*The tops, the fruit, and the volatile oil of the fruit of Juniperus communis,* D. E. *The fruit and the English oil distilled from the fruit of Juniperus communis,* L. *Common Juniper.* Indigenous; belonging to the Natural family *Coniferæ* (*Pinaceæ,* Lindley), and to the Linnæan class and order *Diœcia Polyandria.*

BOTANICAL CHARACTERS.—A bushy shrub from two to eight feet high, evergreen; Leaves, linear, mucronate; Flowers appearing in May, axillary, small; Fruit, a berry (*galbulus*), three-seeded, requiring two seasons to arrive at maturity.

PREPARATION.—The tops are cut in spring before the plant flowers, and the berries are gathered when ripe, both are dried with stove heat; the oil is obtained from the berries by simple distillation.

PHYSICAL PROPERTIES.—*Juniper berries* are spherical, somewhat larger than a pea, of a bluish-black colour; they have a strong aromatic, terebinthinate odour, and a sweetish, pungent, terebinthinate taste. They are imported from Hamburgh and from several of the Mediterranean ports.—*Juniper tops* have a similar odour and taste, but both much weaker.—*Juniper oil* is limpid, transparent, lighter than water, and of a very pale-greenish colour. It has the peculiar odour and taste of the berries in a marked degree. Its composition is $C^{10} H^{8}$ being isomeric with oil of turpentine, and its specific gravity, ·911.

CHEMICAL PROPERTIES.—The medical properties of juniper are due to the volatile oil; the berries contain besides, resin, sugar, gum, wax, and some salts of lime, The tops and berries yield their active principles to boiling water and to alcohol.

THERAPEUTICAL EFFECTS.—Juniper is a stimulating diuretic, promoting the secretion of urine to which it communicates its peculiar odour. It is chiefly employed as an adjunct to other diuretics in dropsical affections; its use is contraindicated if the kidney is diseased, or if any inflammatory symptoms are present.

DOSE AND MODE OF ADMINISTRATION.—The berries are best prescribed in the form of infusion. The tops are at present scarcely ever employed.

Infusum Juniperi, D. (Take of Juniper berries, bruised, one ounce; boiling water, half a pint: infuse for one hour in a covered vessel, and strain. The product should measure about eight ounces.) Dose, f℥ij. to f℥iij., three or four times a-day.

Spiritus Juniperi compositus, D. L. E. ("Take of Juniper berries, bruised, eight ounces; caraway seeds, bruised; fennel seed, bruised, of each, one ounce; proof spirit, half a gallon; water, one pint, macerate the berries and the seeds in the spirit, for twenty-four hours; then add the water, and with a slow fire distil off half a gallon," D. "Oil of Juniper, fʒiss.; oil of caraway; oil of fennel, of each, min. xij.; proof spirit, cong. j.; dissolve," L. "Juniper berries, bruised, ℔j.; caraway, bruised; and fennel, bruised, of each, ℥iss.

proof spirit, Ovij. ; water, Oij. ; macerate the fruit in the spirit for two days, add the water, and distil, Ovij.," E.) A powerful diuretic, introduced into the pharmacopœias as a substitute for *Geneva.* Dose, fʒij. to fʒiv. Generally used as an adjunct to stimulating diuretic mixtures.

Oleum Juniperi, D. L. E. (Obtained from the berries according to the general process for obtaining volatile oils.*) Dose, min. iij. to min. v. as an oleo-saccharum or dissolved in spirit. It is to the presence of this oil that the spirit called *Geneva* or *Hollands* owes its peculiar flavour and the diuretic properties it possesses.

PAREIRA, D. L. E.—*Root of Cissampelos pareira. Pareira-brava. Velvet Leaf.* This plant is an inhabitant of the West

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* The following general directions for obtaining volatile oils are given in the Dublin and Edinburgh Pharmacopœias ; they are introduced here as it is the first instance in which a volatile oil, thus prepared, has come under consideration. In the last edition of the London Pharmacopœia the volatile oils are contained in the Materia Medica list, and therefore no directions are given for their preparation.—*Dublin.*—" The substance from which the oil is to be extracted is macerated for twenty-four hours, with five times its weight of water, in a sheet-tin or copper still, and, a condenser being then attached, half the water is drawn over by distillation, on the surface of which the oil will be found to float, unless (which is rarely the case) it should be heavier than water, when it will be found at the bottom of the receiver. The oil having been separated, the aqueous product, which is a saturated solution of the oil in water, is to be returned to the still, and the distillation resumed, and continued till the resulting liquid has the same volume as before. The oil is again separated, the watery product returned to the still, and the distillation resumed ; and this process is to be repeated until it ceases to afford any additional oily product. The oil thus obtained is to be separated as completely as possible from water, and preserved in a well-stopped bottle. The water distilled over in the preparation of the several oils should be preserved for medical use." *Edinburgh.*—" Volatile oils are obtained chiefly from the flowers, leaves, fruits, bark, and roots of plants, by distilling them with water, in which they have been allowed to macerate for some time. In order to obtain these oils profitably, and of good quality, a great variety of conditions must be attended to, differing in regard to each, and such as it would be out of place to enumerate here in detail. Certain general principles, however, may be mentioned. Flowers, leaves, and fruit generally yield the finest oils and in greatest quantity when they are used fresh. Many, however, answer equally well, if they have been preserved by beating them into a pulp with about twice their weight of muriate of soda, and keeping the mixture in well-closed vessels. Substances yielding volatile oils must be distilled with water, the proper proportion of which varies for each article, and for the several qualities of each. In all instances, the quantity must be such as to prevent any of the material from being empyreumatized before the whole oil is carried over. In operations where the material is of pulpy consistence, other contrivances must be resorted to for the same purpose. These chiefly consist of particular modes of applying heat, so as to maintain a regulated temperature not much above 212°. On a small scale heat may be thus conveniently applied by means of a bath of a strong solution of muriate of lime, or by means of an oil-bath, kept at a stationary temperature with the aid of a thermometer On the large scale, heat is often applied by means of steam, under regulated pressure. In other operations it is found sufficient to hang the material within the still in a cage or bag of fine net-work ; and sometimes the material is not mingled with the water at all, but is subjected to a current of steam passing through it. The best mode of collecting the oil is by means of a refrigeratory, from which the water and oil drop together into a tall narrow vessel provided with a lateral tube or lip near the top, and another tube rising from the bottom to about a quarter of an inch below the level of the former. It is evident that with a receiver of this construction the water will escape by the lower tube ; while the volatile oil, as it accumulates, will be discharged by the upper one, except in the very few instances where the oil is heavier than water."

Indian isles and of the South American Main; it belongs to the Natural family *Menispermaceæ*, and to the Linnæan class and order *Diœcia Monadelphia.* According to Aublet, Pareira brava is the root of *Abuta rufescens*, the *Cocculus platiphylla* of St. Hilaire, which also belongs to this family. It is probable that the roots of several allied plants are sold in commerce as Pareira brava.

BOTANICAL CHARACTERS.—It is described as being a climbing shrub, with a woody branching root; Leaves smooth, silky beneath; Flowers, small, yellow; Berries, scarlet, roundish, hispid.

PHYSICAL PROPERTIES.—Pareira root is imported in cylindrical pieces, from half-an-inch to three inches in diameter, and from five or six inches to three or four feet in length. It is covered externally with a dark-brown cortex, which is thin and firmly adherent; internally the wood is very porous, of a pale reddish-yellow colour; odourless, but with a sweetish, aromatic, intensely bitter taste.

CHEMICAL PROPERTIES.—It consists of a soft resin, a bitter extractive *(Cissampelina)* on which its activity depends, fecula, nitrate of potash and other salts, colouring matter, lignin, &c. Cissampelina *(Pelosina)* is an alkaline white powder, soluble in alcohol and ether; it forms salts of which the hydrochlorate crystallizes; its composition is $C^{36}H^{21}NO^{6}$. The root yields its virtues to both cold and boiling water.

THERAPEUTICAL EFFECTS.—Pareira is a tonic diuretic, acting specifically on the urinary organs, increasing their secretion, and at the same time checking discharges from the mucous membrane of the bladder and urethra. It is with the latter intention only that it is ever employed at present; and according to the observations of Sir Benjamin Brodie and other surgeons, it has a great influence over the ropy mucous discharge of chronic inflammation of the bladder.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form. ʒss. to ʒj.

Extractum Pareiræ, L. E. ("Pareira, sliced, ℔iiss.; boiling distilled water, cong. ij.; macerate for 24 hours, then boil down to cong. j., and strain the liquor while yet hot; lastly, evaporate to a proper consistence," L. "Prepared as extract of Gentian," E.) Dose, gr. x. to ʒss., generally given as an adjunct to the infusion.

Infusum Pareiræ, D. E. ("Take of Pareira root, bruised and torn into shreds, half an ounce; boiling water, nine ounces: digest for one hour, in a covered vessel, and strain. The product should measure about eight ounces," D. "Pareira, ℥vj.; boiling water, Oj.; infuse for two hours in a lightly-covered vessel, and then strain through linen or calico," E.). The preparation of the Edinburgh Pharmacopœia is much too weak. Dose, f℥j. to f℥iv., three or four times a-day. Christison recommends the infusion to be prepared with cold water, and by the process of percolation, but boiling water more completely extracts the bitter principle.

Decoctum Pareiræ, L. (Pareira, ʒx.; distilled water, Oiss.; boil down to Oj., and strain.) Dose, f℥j. to f℥iij. three or four times a day. This is the preparation in most general use.

INCOMPATIBLES.—The sesqui-salts of iron ; the acetates of lead ; and tincture of iodine.

POTASSÆ ACETAS.—*Acetate of Potash* (described in the division *Cathartics*), dissolved in a large quantity of water and given in small doses frequently repeated, operates as a mild but certain diuretic. It is employed most generally as an adjunct to other remedies of this class, in ascites and hydrothorax. It has been recently very highly recommended for the treatment of psoriasis, lepra, and eczema, by Dr. Easton, of Glasgow, in doses of half a drachm three times a-day, dissolved in an ounce of water ; but from its use, thus administered in these diseases, I have not seen the least good result to follow. Dose, as a diuretic, gr. x. to gr. xx. ; it is best administered in decoction of broom tops, or of Pyrola.

POTASSÆ BITARTRAS.—*Bitartrate of Potash* (described in the division *Cathartics*), when administered in small doses dissolved in a large quantity of water, or in combination with other diuretics, increases the secretion of urine remarkably, and consequently is very generally employed in all forms of dropsy. Dose, as a diuretic, gr. xx. to ʒj., frequently repeated.

Imperial, an excellent diuretic and refrigerant drink in febrile diseases, is prepared by dissolving ʒj. or ʒij. of bitartrate of potash in Oj. of boiling water, and flavouring with lemon-peel and sugar.

Cream of tartar whey used for the same purpose, is prepared by boiling ʒiss. of the bitartrate in Oj. of new milk, and straining to remove the curd. Either of these drinks may be taken *ad libitum.*

POTASSÆ NITRAS, D. L. E. NITRUM, D.—*Nitrate of Potash. Nitre. Saltpetre. Sal-prunelle.*

PREPARATION.—Nitrate of potash is an article of the Materia Medica ; it is imported into Britain chiefly from the East Indies, where it is obtained by lixiviating the surface of the soil of certain districts, dissolving out with water the saline matters contained therein, filtering and crystallizing ; after importation, the salt is purified by solution and recrystallization. The *Dublin College* directs the commercial salt to be further purified by the following process, when it constitutes *Potassæ nitras purum*:—"Take of commercial nitre, four pounds ; distilled water, five pints, or a sufficient quantity : having dissolved the nitre in two pints of the water at a boiling temperature, let the heat be withdrawn, and the solution be stirred constantly as it cools, in order that the salt may be obtained in very minute crystals. These, deprived as much as possible of the uncrystallized solution by decantation and draining, are to be washed in a glass or earthenware percolator with the remainder of the water, or until the liquid which trickles through ceases to give a precipitate when dropped into a solution of nitrate of silver. The contents of the percolator should now be extracted, and dried in an oven."

PHYSICAL PROPERTIES.—A solid colourless salt, in striated prismatic crystals generally six-sided, with dihedral summits, semitransparent, inodorous, having a cooling, saline, slightly bitter taste. Specific gravity, 1·933.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potash and one of nitric acid, (KO, NO^5), is anhydrous, permanent in the air, fusible by a heat below redness into a limpid liquid, in which state, when cast in moulds, it forms *sal-prunelle;* by a strong heat it is decomposed into oxygen, and hyponitrite of potash. Nitre is soluble in four parts of water at 60°, and in about half its weight of boiling water; during the solution cold is generated; it is insoluble in absolute alcohol.

ADULTERATIONS.—Nitrate of potash, as met with in commerce, is often contaminated with sulphate of potash or chloride of potassium; the presence of the former is detected by solution of hydrochlorate or nitrate of baryta, that of the latter, by solution of nitrate of silver, causing white precipitates, in a solution of the salt in distilled water. The following are the characteristics and tests given for nitre in the London Pharmacopœia:—"Soluble in water; nothing is thrown down from the solution by chloride of barium or nitrate of silver; it melts by heat without losing weight, and at a red heat gives off oxygen gas; sulphuric acid disengages nitrous vapours from the salt which is left when reduced to powder. It deflagrates when thrown on red-hot charcoal, carbonate of potash being left. From 100 grains digested in sulphuric acid, 86 grains of sulphate of potash are procured when dried at a red heat."

THERAPEUTICAL EFFECTS.—In large doses, from ʒvj. to ℥ij., nitre acts as an irritant to the gastro-intestinal mucous membrane, producing generally nausea, vomiting, purging, and even death. In small doses, gr. xxx. to gr. xl., it increases the flow of urine, in which secretion it can be detected soon after it has been swallowed. It is generally employed as an adjunct to the vegetable diuretics in anasarca and ascites, but is inadmissible in cases where there is any tendency to irritation or inflammation of the digestive tube. Nitrate of potash is greatly inferior as a diuretic to the acetate or bitartrate, and in the present day is, consequently, more employed for its refrigerant properties. (See, also, *Refrigerants.*)

INCOMPATIBLES.—Sulphuric acid; alum; sulphate of magnesia; metallic sulphates; and hydrochloric acid if heat be applied.

PYROLA, D. E. CHIMAPHILA, L.—*Herb of Chimaphila umbellata. Umbelled Winter-green. Pyrola. Pipsissewa.* This plant is a native of North America, but is also found in the woods of Europe and Asia. It belongs to the Natural family *Pyrolaceæ,* and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A beautiful evergreen, six to eight inches high, with cuneato-lanceolate leaves, coriaceous, smooth and shining ; Flowers in a small corymb, reddish-white, fragrant.

PHYSICAL PROPERTIES.—Although the entire herb is indicated by the colleges, the leaves only are generally employed. In the fresh state when bruised they have a strong unpleasant smell, but in the dry state they are odourless ; they have a bitter-sweet, astringent, slightly aromatic taste. If applied to the skin when recently gathered, they produce irritation and even slight vesication.

CHEMICAL PROPERTIES.—They contain bitter extractive, resin, tannin, &c. ; the medical virtues probably depend on the combination of these three substances ; they are communicated to boiling water by infusion, but more completely by decoction.

THERAPEUTICAL EFFECTS.—Pyrola leaves operate as a tonic diuretic, exerting a specific influence on the urinary organs, increasing the discharge of urine, and according to many observers, diminishing the secretion of lithates. They have been chiefly used in dropsies occurring in the old and debilitated, and in chronic mucous discharges from the bladder and urethra. In the advanced stages of albuminuria where diuretics are sometimes called for, I have administered the decoction of this herb with excellent effect.

DOSE AND MODE OF ADMINISTRATION.—Never given in powder.

Decoctum Pyrolæ, D. *Decoctum Chimaphilæ*, L. (" Take of leaves of winter-green, dried, half an ounce ; water, half a pint : boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D. " Chimaphila, ℥j. ; distilled water, Oiss. ; boil down to a pint and strain," L.) Dose, f℥j. to f℥ij. three or four times a-day. An extract may be prepared by evaporating the decoction to a proper consistence ; it is not used in this country, but has been employed in America in doses of from gr. v. to gr. xv.

INCOMPATIBLES.—The sesqui-salts of iron ; and all substances incompatible with tannin.

SCILLA, D. L. E.—*The bulb of Urginea scilla*, D. *Fresh bulb of Urginea scilla*, L. *Bulb of Squilla maritima*, E. *Squill*. A native of the shores of the Mediterranean, of France, and of Portugal ; belonging to the Natural family *Liliaceæ*, and to the Linnæan class and order *Hexandria Monogynia.*

BOTANICAL CHARACTERS.—Bulb, very large, sending up annually a scape or flowering stem from two to three feet high, terminated by a dense long raceme of white flowers ; the leaves, which appear after the flowers, are broadly lanceolate, 12 to 18 inches long.

PREPARATION.—The bulb, which is the officinal part of the plant, is dug up in autumn. divided into four parts, the centre cut out and rejected as being inert, and the remainder cut into thin slices, which are dried quickly with a gentle heat. The London College directs squill to be dried for use in medicine in the same manner as colchicum (See page 107.) Sometimes, however, the bulb is imported entire. Squill is brought from Malta, and other Mediterranean ports; also from St. Petersburg and Copenhagen.

PHYSICAL PROPERTIES.—The entire bulb varies in size from that of the fist to that of a child's head, ovoid, covered externally with layers of thin, reddish (*squilla rubra*), or whitish (*squilla alba*), papery membranes; internally, it is composed of thick, fleshy, concentric scales, of a pale rose-colour. Dried squill is in yellowish, somewhat translucent slices, brittle, but readily attracting moisture, when they become flexible; it is odourless, but has an acrid, very nauseous taste.

CHEMICAL PROPERTIES.—According to the analysis of M. Tilloy, squill consists of—1. a very acrid, poisonous, resinoid substance, soluble in alcohol but not in ether; 2. a very bitter, yellow principle *(Scillitine?)*, soluble in water and in alcohol; 3. a fatty matter, tasteless, soluble in ether, but not in alcohol when it is entirely deprived of the acrid and bitter principles; 4. citrate of lime; and 5. mucus and sugar. A recent analysis by M. Marais shows that it contains also traces of iodine. *Scillitine*, as obtained by Marais, is an uncrystallizable, semi-transparent substance, hygrometric but not deliquescent, as he found it to be insoluble in water, but soluble in cold alcohol and ether; it has an intensely bitter, penetrating taste. Squill yields its virtues to alcohol, vinegar, and the dilute acids. The sesqui-salts of iron communicate a deep blue colour to the infusion, but it is not affected by gelatin, or by tincture of iodine.

THERAPEUTICAL EFFECTS.—In large doses squill acts as a narcotico-acrid poison, twenty-four grains of the powder having proved fatal. In medicinal doses it operates as an emetic, expectorant, and diuretic; for the latter purpose it is usually given in combination with digitalis and calomel, when it seldom fails to produce increased flow of urine, and at the same time promote the absorption of the effused fluid in dropsies. Squill is better adapted for local than for general dropsy; it is generally held to be inadmissible when inflammatory symptoms are present. (See, also, *Emetics* and *Expectorants.)*

DOSE AND MODE OF ADMINISTRATION.—To reduce squill to powder the slices should be carefully dried at a temperature not exceeding 100° F., and immediately triturated in a dry, warm mortar. The powder should be kept in close-fitting glass-stoppered bottles, in a warm place, as it attracts moisture rapidly from the air. Dose, as a *diuretic*, gr. j. to gr. iij., usually given in the form of pill made with conserve of roses or some soft extract.

Tinctura Scillæ, D. L. E. ("Squill, dried and in coarse powder, ℥v.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Squill, recently dried, ℥v.; proof spirit, Oij.; macerate for seven days, express, and filter," L. "Squill, in coarse powder, ℥v.; proof spirit, Oij.; prepare by percolation as for tincture of cinchona, but without packing the pulp firmly in the percolator; it may likewise be prepared by digestion with the sliced bulb," E.) Dose, min. x. to min. xxx. An excellent addition to infusion of digitalis or decoction of broom-tops.

Acetum Scillæ, D. L. E. ("Take of squill, dried and bruised, two ounces; acetic acid of commerce (specific gravity, 1044), four fluid ounces; distilled water, twelve ounces; in the acid, diluted with the water, macerate the squill in a close vessel for seven days; then strain with expression, and filter," D. "Squill, recently dried and bruised, ℥iiss.; dilute acetic acid, Oj.; proof spirit, f℥iss.; macerate the squill in the acid with a gentle heat for 3 days in a close vessel; then express and set aside that the dregs may subside; finally add the spirit to the filtered liquor," L. "Squill, dried and in small fragments, ℥v.; distilled vinegar, Oij.; proof spirit, f℥iij.; macerate the squill in the vinegar for 7 days in a covered vessel; strain and express the liquor, add the spirit and filter the whole," E.) Dose, fʒss. to fʒiss. in some aromatic or distilled water.

Vinum Scillæ, (Squill, 30 parts; white wine, 500 parts; macerate for 14 days, and filter.) Dose, fʒj. to fʒiij.

INCOMPATIBLES.—The alkalies; and the sesqui-salts of iron.

SCOPARIUM, D. E. SCOPARIUS, L.—*The top branches of Cytisus scoparius*, D. *The fresh and dried tops of Cytisus scoparius*, L. *The tops of Cytisus scoparius*, E. *Broom-tops.* The common-broom is an indigenous shrub; belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley,) and to the Linnæan class and order *Diadelphia Decandria.*

BOTANICAL CHARACTERS.—A bushy shrub from three to six feet high; with long, straight, green branches; and large, bright yellow, papilionaceous flowers.

PHYSICAL PROPERTIES.—The fresh green tops, the only officinal part, have a peculiar odour when bruised, and a bitter, somewhat nauseous taste.

CHEMICAL PROPERTIES.—Broom-tops, according to a recent analysis of Stenhouse, contain a peculiar substance soluble in boiling water and alcohol; it is of a yellow colour and when purified can be got in stellate crystals. The composition of this principle, which he named *Scoparin*, is $C^{21} H^{11} O^{10}$. Dr. Stenhouse procured it by evaporating the watery decoction down to a tenth part, whereby a gelatinous mass, consisting chiefly of scoparin was left; on it and a portion of volatile oil it is probable that the medicinal virtues of broom-tops depend. These are extracted by boiling water.

THERAPEUTICAL EFFECTS.—In the form of decoction, broom-tops are an excellent and certain diuretic, seldom failing to produce a copious secretion of urine. The officinal preparations are most generally employed as vehicles for the more active remedies of this class in the treatment of dropsical effusions. According to Stenhouse, scoparin is a diuretic of much power and great certainty, almost invariably causing a copious flow of urine in 12 hours after it has been taken.

DOSE AND MODE OF ADMINISTRATION.—The dose of *Scoparin* is five or six grains. Broom-tops are only given in the following forms, but if Stenhouse's experiments are to be depended on, an extract would be much more certain in its action.

Decoctum Scoparii, D. E. ("Take of broom-tops, dried, half an ounce; water, half a pint; boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D. "Broom-tops; and juniper tops, of each, ℥ss.; bitartrate of potash, ʒiij.; water, Oiss.; boil down to a pint and strain," E.).—*Decoctum Scoparii compositum*, L. (Broom-tops; juniper, bruised; and dandelion, bruised, of each, ℥ss.; distilled water, Oiss.; boil down to a pint and strain.) Excellent diuretics, particularly the two latter, which scarcely ever fail to act on the kidneys. Dose, f℥j. to f℥iv., three or four times a-day.

SODÆ ACETAS, D.—*Acetate of Soda.*

PREPARATION.—Take of crystallized carbonate of soda of commerce, one pound, or a sufficient quantity; acetic acid of commerce (specific gravity, 1044), one pint; to the acid, placed in a porcelain capsule, add by degrees the carbonate of soda, and, taking care that there shall be a slight excess of acid, evaporate the resulting solution till a pellicle begins to form on its surface, and set it by to crystallize. The crystals, when drained of the mother liquor, and dried by a short exposure to air on a porous brick, should be enclosed in a well-stopped bottle.

PHYSICAL PROPERTIES.—In white, striated, prismatic crystals, of the oblique rhombic series. It has a faint acetous odour when moistened, and a sharp, cooling, saline taste.

CHEMICAL PROPERTIES.—It consists of 1 equivalent of soda, 1 of acetic acid, and 6 of water of crystallization, ($Na\,O,\ C^4H^3O^3, + 6HO$). It is unalterable in ordinary states of the air, but in dry warm air effloresces slightly; is soluble in 3 parts of water at 60°, and in somewhat less than its own weight of boiling water; and is also soluble in five times its weight of alcohol. Exposed to heat acetate of soda undergoes the watery fusion, loses all its water of crystallization at the heat of 550°, and at a heat of 600° it is decomposed.

THERAPEUTICAL EFFECTS.—A mild diuretic, similar in operation to acetate of potash, over which it does not possess any advantage, but for which it may be substituted. It is very rarely used in the present day, and consequently has been omitted from the last edition of the London Pharmacopœia.

DOSE AND MODE OF ADMINISTRATION AND INCOMPATIBLES.—Same as acetate of potash.

SODÆ BIBORAS.—*Borax* (described in the division *Astringents*), is an excellent diuretic in cases of uric acid gravel, as a solution of it dissolves that acid freely, and does not produce any injurious constitutional effect, even when its use has been continued for some time. Borax should not be administered to pregnant females, as it stimulates the uterus and has in some instances caused abortion.

TEREBINTHINÆ OLEUM.—*Oil of turpentine* (described in the division *Anthelmintics*), given in small doses frequently repeated acts as a stimulant to the renal vessels, causing an increased flow of urine, to which it communicates a violet odour. It also possesses a specific action over the mucous membrane of the bladder and urethra, checking excessive discharges, and giving increased tonicity to the vessels which secrete the mucus. If the use of oil of turpentine be too long continued, it is apt to produce strangury, bloody urine, and even sometimes total suppression of the secretion. The dose of this oil as a diuretic is from min. x. to min. xxx. It has occasionally proved serviceable in dropsical effusions, but its stimulating property forbids its employment if there is any tendency to inflammatory action. It is frequently employed with much benefit in gleet, in leucorrhœa, and in chronic cystirrhœa. Under the use of oil of turpentine, the quantity of lithic acid in the urine is much increased, owing to which it frequently proves very beneficial in chronic rheumatism and in sciatica, occurring in the old and debilitated.

TEREBENTHINA CHIA, L. E.—*Liquid resin of Pistacia terebinthus. Chian turpentine. Scio turpentine.* This tree is a native of parts of the South of Europe, of the Grecian Archipelago, and of Syria; it belongs to the Natural family *Anacardiaceæ*, and to the Linnæan class and order *Diœcia Pentandria.*

BOTANICAL CHARACTERS.—Stem, 30 to 35 feet high; Leaves, pinnate; young leaves, reddish; Flowers in compound racemes; Fruit, globular, purplish, inclosing an osseous, one-seeded nut.

PREPARATION.—The liquid resinous exudation, which constitutes the Chian turpentine of commerce, is obtained chiefly in the island of Scio, by making incisions into the trunk of the tree, and allowing the juice which flows out to harden on large flat stones placed under; each tree yields from 8 to 10 ounces only.

PHYSICAL PROPERTIES.—It is of the consistence of very thick honey, but often nearly solid; of a pale greenish-yellow colour; has a weak terebinthinate, somewhat fragrant odour, and a slightly bitter taste.

CHEMICAL PROPERTIES.—Chian turpentine consists of volatile oil, and resin. It resinifies by keeping or by exposure to the air, when it loses its fragrancy. This turpentine is very scarce, Strasbourgh or Venice turpentine being usually substituted for it.

THERAPEUTICAL EFFECTS.—It resembles oil of turpentine in its action on the urinary organs; but by many it is supposed to act more effectually in stopping chronic mucous discharges.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx. three or four times a-day; it may be made into pills with powdered liquorice root or gum arabic, or may be given in emulsion with yolk of egg or mucilage.

UREA. *A peculiar principle contained in the urine of many animals.*

PREPARATION.—By evaporating fresh human urine to the consistence of a syrup, treating with nitric acid, washing well with distilled water the nitrate of urea, decomposing with carbonate of potash, dissolving the precipitated urea in alcohol and crystallizing. By the following elegant process of Liebig, ℥iv. of perfectly colourless crystallized urea may be procured from ℔j. of ferrocyanate of potash:—"Mix together 28 parts of perfectly dry ferrocyanate of potash with 14 of oxide of manganese, both in fine powder; place the mixture upon a smooth iron plate, and expose it to a dull red heat over a charcoal fire. By-and-by it will begin to burn of itself, when it is to be frequently stirred about. After it cools it is to be lixiviated with cold water. The solution is to be treated with 20½ parts of dry sulphate of ammonia, whereupon a copious deposit of sulphate of potash will ensue. It is then to be allowed to stand for some time in a warm place (under 212° F.), so as to concentrate the supernatant liquor, which is afterwards to be decanted, treated with alcohol of a density of ·835 to ·865, and crystallized."

PHYSICAL PROPERTIES.—It occurs in long, colourless, transparent crystals, which are flattened four-sided prisms. They are heavier than water, have a cooling sharp taste, but are inodorous.

CHEMICAL PROPERTIES.—It consists of 2 equivalents of carbon, 2 of oxygen, 4 of hydrogen, and 1 of nitrogen ($C^2O^2H^4N^2$). It is soluble in its own weight of water at 60°, in 4 or five parts of cold alcohol, and in 2 parts of boiling alcohol; is unalterable in dry air, but deliquesces in damp air; fuses at 248°, and is decomposed at a higher temperature. Urea is a feeble base combining with most acids without neutralizing them.

THERAPEUTICAL EFFECTS.—Urea is at present scarcely ever employed as a diuretic, although from the reports of several French practitioners it appears to promote remarkably the secretion of urine, without producing any general disturbance of the animal economy.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xx. dissolved in sweetened distilled water. It may be also given made into pill or bolus, with any soft extract, or with honey or treacle.

CHAPTER IX.

EMETICS.

(Vomits.)

EMETICS are substances which are used for the purpose of producing vomiting. The number of medicines employed with this intention is but few, and they act either *specifically*, that is, they excite vomiting when injected into the veins as well as when introduced into the stomach, or their operation is *topical*, producing vomiting only when taken into the stomach. Tartar emetic is an example of a *specific*, mustard of a *topical* emetic. It would be out of place here to enter into any consideration of the phenomena and pathology of vomiting; it must suffice to say, that independently of the mere evacuation of the contents of the stomach, emetics generally influence the entire system sympathetically. The primary effect of most emetics is the production of nausea, during which there is general relaxation of the muscular system, with a well marked diminution in the force of the circulation; by the administration of remedies of this class in doses not quite sufficient to cause vomiting, this effect may be produced with much certainty, and is frequently had recourse to as a therapeutical agent in cases in which it is required to allay spasm or to subdue commencing inflammation. The act of vomiting, on the other hand, excites the circulation, increases the frequency of the pulse, and, determining to the surface of the body, promotes cuticular transpiration; the urinary secretion also is frequently augmented during the operation of an emetic, and the liver stimulated to an increased discharge of bile. Emetics are, therefore, often administered with the view of producing so to say a general *perturbation* of the system, in the hope of cutting short fevers and other severe diseases at their very commencement, and frequently with decided results. In prescribing emetics, attention must be paid to the differences which exist in their mode of operation. Some medicines of this class, as sulphate of zinc and sulphate of copper, produce their effects very rapidly, exciting vomiting almost immediately after they are swallowed, without occasioning much nausea or depression. Tartar emetic operates more slowly, and causes great nausea, accompanied by a feeling of feebleness and exhaustion. While the vegetable emetics, as ipecacuanha and squill, require a much longer time for their operation. In selecting a particular remedy of this class, therefore, we should be always guided by the nature of the indication which is to be fulfilled. When there are symptoms of determination of blood to the cerebral organs, emetics must be employed with great caution, in consequence of the obstruction of the circulation which is occasioned during the act of vomiting; for the same reason also they ought not to be administered in diseases of the heart and larger arteries, more especially when aneurism exists. From the violent action of the abdominal muscles which is caused, the act of vomiting is attended with great risk in the advanced stages of pregnancy, in hernia, and in prolapsus uteri.

AMMONIÆ SESQUICARBONAS.—*Sesquicarbonate of ammonia* (described in the division *Antacids*), given in doses of gr. xxx. or upwards, acts as a stimulating emetic, without producing much nausea or depression. It is consequently employed in cases of great debility when the use of an emetic is indicated; as in chronic bronchitis occurring in broken-down constitutions, and in the suffocative catarrh of fever. But in consequence of the uncertainty of its operation, mustard is generally preferred in these cases.

ANTIMONIUM TARTARIZATUM.—*Tartar emetic* (described in the division *Diaphoretics*), administered in doses of two or three grains dissolved in water, operates as a powerful emetic, producing at the same time general depression, and much nausea. The act of vomiting does not occur for from twenty minutes to half an hour after the emetic has been taken, but it is then usually energetic and frequently repeated. The emetic action is *specific,* as this medicine operates not only when administered by the stomach or rectum, but when injected into the veins, or otherwise introduced into the vascular system. Tartar emetic is employed in all cases in which it is wished to produce a powerful impression on the system, and at the same time lower the circulation; as in the early stages of febrile or inflammatory affections, when if given at the very commencement of the symptoms, the disease is frequently cut short: with this view it is employed in common continued fever, in acute ophthalmia, in croup, in hooping cough, in hernia humoralis, in bubo, &c. In cases of threatened suffocation from the lodgment of solid bodies in the œsophagus, tartar emetic has been successfully injected into the veins to produce vomiting and thereby the expulsion of the substance. In cases of poisoning, it is inferior to other remedies of this class, in consequence of the slowness of its operation and its depressing effects. Tartar emetic is also frequently administered with the intention of producing nausea without causing vomiting: thus it is used in cases of strangulated hernia, to cause relaxation of the parts and permit the return of the contents of the sac; in rigidity of the os uteri obstructing labour; in dislocation to relax the muscular system; and in spasmodic stricture. It is best administered in distilled water; gr. ij. may be dissolved in f℥viij. of water, and of this f℥ij. should be given every ten minutes until vomiting is produced, or f℥j. every quarter of an hour if it is wished to produce nausea merely. It is sometimes given in the form of enema; for this purpose gr. vj. are to be dissolved in Oj. of tepid water: in this form, however, its operation is uncertain. For injection into the veins, gr. ij. or gr. iij. are dissolved in f℥ij. of tepid distilled water. (See, also, *Epispastics*, *Expectorants*, and *Sedatives.*)

CUPRI SULPHAS.—*Sulphate of Copper* (described in the division *Astringents*), in doses of from gr. xij. to gr. xv. operates as a speedy and effectual emetic, producing generally a single but complete evacuation of the contents of the stomach, without causing any depression of the system. This salt is applicable as an emetic in cases of poisoning only, but from its being apt to act as a powerful irritant if vomiting be not speedily produced, sulphate of zinc should be preferred in such a case; for the same reason it ought to be given in the full doses above mentioned.

IPECACUANHA, D. L. E.—*Ipecacuanha. Root of Cephaëlis ipecacuanha.* A native of Brazil; belonging to the Natural family *Cinchonaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Root perennial, generally simple; Stem, shrubby, ascending, 2 to 3 feet long; Leaves, opposite, ovato-lanceolate, 4 to 8 placed at the end of the stem and branches; Flowers, white, in terminal, pendulous heads; Fruit, a fleshy black berry.

PREPARATION.—The roots are gathered at all seasons of the year, cut from the stems, dried in the sun, and packed in bundles of various size.

PHYSICAL PROPERTIES.—Ipecacuan root is in pieces from three to six inches long, about the thickness of a writing pen, irregularly twisted and bent, presenting many circular depressions at short intervals, which give the root an annulated appearance, resembling a number of rings placed side by side on a common axis. It breaks with a short, clean fracture, presenting an outward cortical portion of a grayish or grayish-brown colour, and a white woody centre *(meditullium)*. Ipecacuan root is readily reduced to powder, which is of a pale brownish-yellow colour, has a faint nauseous, peculiar odour, and a bitter, somewhat acrid taste.

CHEMICAL PROPERTIES.—The cortical portion of the root is the more active; according to the analysis of Pelletier, it consists of 16 per cent. of a peculiar alkaloid named *emetina*, in which the active properties of the drug reside, 2 of a fat oily matter, 6 of wax, 10 of gum, 42 of starch, and 20 of lignin. Further experiments have proved however that the emetina procured was a very impure preparation, and that ipecacuanha root did not yield more than 1 per cent. of the *emeta* or *emetina* in a pure state. In addition to the matters above mentioned, Willigk, who, in 1851, analysed carefully some specimens of the root, discovered in it a peculiar acid which he named *ipecacuanha acid;* it is of a reddish-brown colour, has a strong bitter taste, and is soluble in ether, alcohol, and water; its composition is $C^{14} H^{8} O^{6}$. Emetina is prepared by dissolving 1 part of an alcoholic extract of ipecacuanha in 10 parts of water, filtering to remove the fatty matter, and adding 1 part of calcined magnesia; evaporating with a gentle heat to dryness, pulverising, washing with cold water, drying and pulverising again; exhausting the powder with boiling alcohol, distilling off the spirit, treating the dry residue with weak sulphuric acid and animal charcoal; and finally precipitating the *emetina* with ammonia. Emetina, as commonly met with, is a dark pasty-looking substance, but when pure is white and pulverulent, inodorous, with a faint bitter taste, alkaline, very soluble in alcohol, sparingly soluble in water, and less so in ether; it is composed of $C^{37} H^{27} N O^{10}$. Ipecacuanha yields its active principles to water and to alcohol.

ADULTERATIONS.—Spurious ipecacuan roots are frequently substituted, especially on the Continent, for the true root, but as none of them present the precise characters of the latter, as given above, the fraud is readily detected. In the London Pharmacopœia the following characteristics are given for ipecacuan root: "Ash-grey, flexuose, fissured and annulated with somewhat elevated ridges, with an acrid, aromatic, somewhat bitter taste." The powder is generally supposed to be very frequently adulterated, but of this we can scarcely judge except by its effect when administered as a medicine.

THERAPEUTICAL EFFECTS.—In full medicinal doses, ipecacuan operates as a certain but mild emetic, at the same time increasing remarkably the secretions. It resembles tartar emetic in the time which elapses after it has been taken before its effects are produced, and also in the act of vomiting being repeated several times; and it differs from that substance in not causing so much nausea or general depression; it has less tendency, also, to act on the bowels. As an emetic, ipecacuanha is adapted for children, for the old or debilitated, and for delicate females, where we wish to produce vomiting without depressing much the vital powers; and also for cases when the indication is to increase the secretions of the pulmonary organs. Thus, it is used with benefit in the gastric febrile disorders of children, to evacuate the contents of the stomach; at the approach of the paroxysm in ague, hysteria, or hooping cough, when it frequently checks the development of the fit; and it is generally given in conjunction with tartar emetic in the febrile and inflammatory disorders in which that substance is employed. As an emetic, ipecacuanha is to be preferred to tartar emetic, when there is any tendency to irritation or inflammation of the digestive organs; it is inferior to the metallic sulphates in cases of poisoning, on account of the slowness of its operation. Small doses of ipecacuanha, when continued for some time, have produced occasionally symptoms analogous to those of salivation caused by mercury. *Emetina* has been very little used in medicine; the only advantages which it possesses over ipecacuanha are the smallness of the dose required to produce vomiting and its freedom from the unpleasant odour and taste of that substance: these are, however, more than counterbalanced by the dangerous symptoms which would result from an overdose. (See, also, *Epispastics* and *Expectorants*).

DOSE AND MODE OF ADMINISTRATION.—In powder, as an emetic, the usual dose of ipecacuanha is from gr. xij. to gr. xx.; but gr. v. or gr. vj. are frequently sufficient; it is best given mixed with warm water, and its action is promoted by tepid drinks: gr. j. is usually enough to act as an emetic for an infant. When administered in combination with tartar emetic, gr. xij. are mixed with gr. j. of the latter. The dose of impure *emetina* is from gr. ss. to gr. iij.; of the pure alkaloid from gr. $\frac{1}{8}$ to gr. ss.; either may be given dissolved in water with the aid of a few drops of dilute sulphuric acid.

Vinum Ipecacuanhæ, D. L. E. ("Ipecacuan root, in coarse powder, ℥iiss.; sherry wine, Oij.; macerate for 14 days with occasional agitation, then strain with expression, and filter," D. "Ipecacuan, bruised, ℥iiss.; sherry wine, Oij.; macerate for seven days, and filter," L. "Ipecacuan, in moderately fine powder, ℥iiss.; sherry, Oij.; macerate for seven days and filter," E.). As an emetic, very generally employed for children, in doses of from min. xx. to f℥j.; seldom for adults, dose fʒij. to fʒiv.

Syrupus Ipecacuanhæ, E. (Ipecacuan, in coarse powder, ℥iv.; rectified spirit, Oj.; proof spirit; and water, of each, f℥xiv.; syrup, Ovij.; digest the ipecacuan in f℥xv. of the rectified spirit at a gentle heat for 24 hours; strain, squeeze the residue, and filter. Repeat this process with the residue and proof spirit, and again with the water, unite the fluids and distil off the spirit till the residuum amounts to ℥xij. Add to the residuum f℥v. of the rectified spirit, and then the syrup.) This syrup is as effectually and much more simply prepared by dissolving an alcoholic extract of the root in distilled water, and adding syrup. It is an excellent preparation for children; about min. xl. of the Edinburgh syrup are equal in strength to one grain of ipecacuanha. The dose, as an emetic for adults, is f℥ij.; for children, min. xx. to fʒj.

INCOMPATIBLES.—The salts of lead, and of mercury; the vegetable acids; and all astringent vegetable infusions.

SCILLA.—*Squill* (described in the division *Diuretics*), in full medicinal doses, generally produces nausea and vomiting; but its action is uncertain, and therefore it is not much used as an emetic. It is sometimes, however, given to children with this intention in hooping-cough, and in the advanced stages of bronchitis or of croup. In consequence of its stimulating effects, it is inadmissible where there is any tendency to inflammation. The preparation of squill usually employed as an emetic is the following:—

Syrupus Scillæ, D. E. *Oxymel Scillæ*, L. ("Take of vinegar of squill, f℥viij.; refined sugar in powder, ℔j. Dissolve the sugar in the vinegar of squill, with the aid of a steam or water heat," D. "Vinegar of squills, Oiiss.; honey, ℔v.: evaporate the vinegar with a gentle heat to f℥xij., and mix it with the honey, heated," L. "Squill vinegar, Oiij.; pure sugar, in powder, ℔vij.; dissolve the sugar in the vinegar of squills, with the aid of a gentle heat, and agitation," E.). Dose, as an emetic, for children, f℥j. every quarter of an hour until vomiting is produced.

SINAPIS, D. L. SINAPI, E.—*Flour of the seeds of Sinapis alba and Sinapis nigra*, D. *The seeds of Sinapis nigra and Sinapis alba*, L. *Flour of the seeds of Sinapis nigra, generally mixed with those of Sinapis alba, and deprived of fixed oil by expression*, E. *Flour of mustard. Mustard.* These are indigenous plants, belonging to the Natural family *Cruciferæ (Brassicaceæ*, Lindley), and to the Linnæan class and order *Tetradynamia Siliquosa.*

BOTANICAL CHARACTERS.—Annual; Stem, 3 to 4 feet high; Lower leaves, large, lyrate, rough; Flowers, yellow; Pod with a very short beak, quadrangular; Seeds, dark brown. The white mustard is distinguished by the pod having a long beak, and by the seeds being yellow.

PHYSICAL PROPERTIES.—Table mustard, as met with in the shops, and which is always used in medical practice, is prepared from both the black and white species of sinapis, mixed in nearly equal proportions and ground. Mustard is a greenish-yellow powder, having a somewhat oily aspect, an acrid burning taste, and in the dry state a faint nauseous smell: when moistened it emits a strong penetrating odour, very irritating to the eyes and nostrils. Black mustard is much more pungent than white.

CHEMICAL PROPERTIES.—Black mustard seeds consist of a bland fixed oil; of a peculiar acid, bitter, odourless, and uncrystallizable, which has been named *myronic acid;* of another peculiar principle resembling vegetable albumen and emulsin, which has been named *myrosyne;* and of a third peculiar principle, crystallizable and very volatile, named *sinapisin;* with other unimportant matters. When water is added to mustard, by the mutual action of these principles a pungent volatile oil is formed, and may be obtained by distillation, but this oil does not pre-exist in the seeds; and it is to its formation that the active properties of mustard are due.

ADULTERATIONS.—Flour of mustard is always more or less adulterated with a variety of substances. Wheaten flour which is generally (always, according to Christison) mixed with it, may be detected by tincture of iodine turning a cooled decoction blue. Other sophistications may be discovered by examination with the microscope, or we may judge of their existence by the physical properties of the specimen.

THERAPEUTICAL EFFECTS.—Mustard is a powerful stimulating emetic, and should be preferred to any other remedy of this class when the sensibility of the stomach is greatly reduced, or the vital power is low. Thus, it is employed with much advantage in cases of poisoning, especially with the narcotics or sedatives, in intoxication threatening complete coma, in malignant cholera, in some forms of apoplexy and of paralysis, and in suffocative catarrh occurring in the aged or debilitated. (See, also, *Epispastics.*)

DOSE AND MODE OF ADMINISTRATION.—As an emetic, mustard is given in doses of one or two tablespoonfuls; it is best administered rubbed up with f℥vj. or f℥viij. of tepid water.

VIOLA ODORATA.—The root of this plant (which has been described in the division *Cathartics*,) though not officinal in the British pharmacopœias, possesses well-marked emetic properties, which depend on the presence of an alkaloid named *violina;* this principle operates in a manner precisely similar to *emetina*, and has been found to exist in the roots of all the species of the genus Viola. In their action on the system, violet roots resemble ipecacuanha, for which they would form an excellent substitute; and as many of the species are indigenous, the subject is worthy of more attention than has been hitherto bestowed on it. The dose of the powdered root is from ʒss. to ʒj.

ZINCI SULPHAS. *Sulphate of zinc* (described in the division *Astringents*,) in full medicinal doses from gr. xv. to gr. xxx. operates as a speedy, safe, and efficacious emetic, not producing much nausea or depression, and is therefore preferred to all other medicines of this class in cases of poisoning. It is also applicable to any case in which it is wished to produce a single but complete evacuation of the contents of the stomach. As an emetic, sulphate of zinc is best administered in the full doses above stated, dissolved in three or four ounces of tepid water.

CHAPTER X.

EMMENAGOGUES.

EMMENAGOGUES are medicines supposed to be capable of promoting the menstrual discharge. That any substances have a direct or specific power over the uterine organs has been doubted by many, in consequence of the uncertainty of operation of the so-called specific emmenagogues, and also as the uterus is notan organ intended for the elimination of foreign matter. Nevertheless there are some medicines employed to promote the menstrual secretion, which appear to act solely as stimulants to the uterus, and these shall be considered in this chapter. Suppression or absence of the menstrual discharge is generally the effect of some morbid state of the system, and therefore the remedies which are to be employed should have reference to this morbid state. Thus, when amenorrhœa is the consequence of general debility, recourse must be had to tonics and stimulants; and when it occurs with a state of plethora, leeching or cupping and other lowering plans of treatment must be employed. In the treatment of suppressed, absent, or deficient menstruation, these general remedies should be always used before what may be termed the *specific* emmenagogues are administered, as healthy menstruation is admittedly incompatible with a deranged or diseased state of the constitution, and therefore when such exists, stimulation of the uterine organs cannot be expected to produce the desired effect. Substances which stimulate powerfully the neighbouring organs act *relatively* on the uterine vessels, and consequently are often effectual in restoring the menstrual discharge. Thus, some of the more *acrid cathartics,* as aloes, gamboge, &c.; and the *stimulating diuretics,* as the turpentines, cantharides, &c., are frequently the most certain emmenagogues. More lately it has been proposed to make use of applications to the mammary glands with the view of restoring the menstrual discharge, and for this purpose a warm decoction of the leaves of the castor-oil plant has been successfully employed. But the result must have been due to the warm fomentation of organs between which and the uterus so close a sympathy exists, and not to any medicinal virtue in the substance employed.

CROCUS SATIVUS, STIGMATA, D. CROCUS, L. E.—*The stigmata of Crocus sativus. Saffron.* A native of Asia Minor, now naturalized in England; belonging to the Natural family *Iridaceæ*, and to the Linnæan class and order *Triandria Monogynia.*

BOTANICAL CHARACTERS.—Root, a round cormus; Leaves, linear, with a white central strype; Flowers, appearing in September and October, light purple with red veins; Style single, stigma protruded, drooping, with three linear divisions, fragrant.

PREPARATION.—Early in the morning the flowers are gathered, just as they are about to expand, the stigmata with part of the style picked out, and the rest of the flower thrown away; the stigmata are then spread loosely on white paper, and dried on a small kiln of a peculiar construction. Formerly the over-ripe or injured stigmata were dried under pressure between folds of paper, when they constituted what was called *Cake Saffron*, now no longer met with.

PHYSICAL PROPERTIES.—Saffron, *Hay Saffron*, consists of the dried stigmata in loosely aggregated masses; the colour is deep orange, the odour powerful and agreeably aromatic, in large quantities stupifying; the taste is pungent, aromatic, and somewhat bitter. It is imported chiefly from Spain and France, English saffron not being met with in the market at present. According to Pereira, "one grain of good commercial saffron contains the stigmata and styles of nine flowers; hence 4,320 flowers are required to yield one ounce of saffron."

CHEMICAL PROPERTIES.—Saffron consists of albumen, mucilage, a colouring extractive matter named *polychroite*, which constitutes two-thirds of its weight, volatile oil, &c. It yields its properties readily to water and to alchol; its solution in either being of a deep orange colour.

ADULTERATIONS.—In consequence of the high price of saffron, it is very much adulterated; the petals of the *Carthamus tinctorius* and of the *Calendula arvensis*, pomegranate blossoms, and fibres of smoked beef are used for this purpose. The flowers may be detected by the thickness of their structure, when a specimen is soaked in water: the fibres of beef, by the odour which they emit on being burned. What is at present sometimes sold in England for *cake* saffron, consists of the petals of the *Carthamus tinctorius* made into a paste with gum water. Of the qualities of saffron, we judge by its sensible properties.

THERAPEUTICAL EFFECTS.—Saffron is a stimulant of weak power, exerting a specific influence, by no means well-marked, over the uterine organs; so that it is but a doubtful emmenagogue. In the present day it is scarcely ever employed in medicine, except to give an agreeable odour and a pleasing colour to mixtures. On the continent it bears a high character as a remedy for the severe lumbar pains which so frequently precede or accompany menstruation.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. xij. to ʒj.

Syrupus Croci, D. L. E. ("Take of saffron, chopped fine, ℥ss.; boiling distilled water, Oj.; refined sugar, in powder, as much as is sufficient. Infuse the saffron in the water, in a covered vessel, for twelve hours, then boil for five minutes, and strain through calico with expression; let the decoction stand until the sediment subsides, and having then decanted the clear liquor, add to it twice its weight of sugar, and dissolve with the aid of steam or water heat," D. "Saffron, ʒv.; boiling distilled water, Oj.; sugar, ℔iij. or a sufficiency; rectified spirit, f℥iiss. or a sufficiency; macerate the saffron with water, for twelve hours, in a close vessel; then strain the liquor, add to it more than double its weight of sugar, and dissolve with a gentle heat. Finally, when the syrup is cold, mix with it the rectified spirit in the proportion of fʒss. to each fluid ounce," L. "Saffron, ʒx.; boiling water, Oj.; sugar, ℔iij.; infuse the saffron in the water for twelve hours in a lightly covered vessel; strain the liquid and add the sugar," E.). Dose, fʒij. to f℥ss.; chiefly used for its fine colour.

Tinctura Croci, D. E. ("Take of saffron, chopped fine, ℥ij.; proof spirit, Oj. Macerate for fourteen days, strain, express, and filter," D. "Saffron, chopped fine, ℥ij.; proof spirit, Oij.; prepared like tincture of cinchona, either by percolation or digestion, the former method being more convenient and expeditious," E.). Dose, fʒj. to fʒij.

ERGOTA, D. L. E. *The Ergot of Secale cereale, a peculiar excrescence, supposed to be caused by a parasitical fungus*, D. *The seed of Secale cereale, diseased by a parasitic fungus?* L. *An undetermined fungus with degenerated seed of Secale cereale*, E. *Ergot of rye.* Much difference of opinion exists as to what this substance really is; the latest and best authorities agree that it is a peculiar species of fungus (*Spermoëdia clavus* of Fries and Lindley, *Ergotœtia arbortifaciens* of Quekett and Pereira), which is produced under certain circumstances as yet not fully ascertained, on plants belonging to the Natural families *Graminaceæ*, *Cyperaceæ*, and *Palmaceæ*, but on none so frequently as on *Secale cereale* or common rye.

PHYSICAL PROPERTIES.—Ergot, or spurred rye, consists of angular, sometimes round bodies, from the third of an inch to an inch and a-half in length, retaining the longitudinal depression of the sound grain, obtuse at the extremities, curved like the spur of a cock, whence the name. It is of a violet-brown colour externally, sometimes whitish; yellowish internally. In the entire state, the odour is very faint, but when powdered it has a heavy, mawkish, somewhat animal smell; the taste is acrid and disagreeable; it is firm and fragile, breaking with a clear transverse fracture. Ergot of rye attracts moisture, if exposed to the air, swells, and becomes mouldy, and is attacked by a small insect, a species of *acarus*, which devours the interior and leaves the grain a mere husk, no longer fit for medical purposes; it should therefore be kept in well-stopped bottles. Van Ryn recommends as the most effectual method of preserving ergot, to dry it with a stove heat, pulverise immediately, mix the powder with an equal quantity of powdered white sugar, and keep it in well-stopped glass bottles: thus prepared, he states that it retains its medicinal powers unimpaired for four years.

CHEMICAL PROPERTIES.—According to apparently the most accurate as well as one of the most recent analysis, that of Wiggers, 100 parts contain 35 of fixed oil, 46 of fungin, and 1·25 of *ergotin*—a peculiar principle, besides several unimportant matters, such as phosphates of lime, potash, and iron, gum, sugar, osmazome and wax. The *ergotin* of Wiggers, however, cannot be, as he supposes, the active principle of ergot of rye, as it is insoluble in water. Dr. Wright, an earlier experimenter on this drug, believed its active properties to depend on the fixed oil, which he describes as of a reddish-brown colour, lighter than water, and soluble in alcohol, ether, the volatile oils, and solutions of the caustic alkalies; it is readily procured by evaporating with a gentle heat an ethereal tincture of the ergot prepared by percolation. M. Bonjean at a later period examined with great care the chemical, toxicological and therapeutical properties of ergot. He found it to contain two very distinct active principles, the one a soft, reddish-brown extract, very soluble in water, which he has named *ergotin*, and on which the obstetrical and anti-hemorrhagic properties of the drug depend; and the other, a colourless fixed oil, very soluble in ether, and which alone is the poisonous principle. He obtains the ergotin by percolating powdered ergot with cold water, evaporating the product in a water-bath to the consistence of an extract, treating the watery extract with rectified spirit, and evaporating the alcoholic solution thus obtained; this alcoholic extract is the ergotin. By this process a reddish-brown, homogeneous extract is obtained; it has a pungent bitter taste, and an odour resembling that of roast meat. It forms with water a beautiful red solution, limpid and transparent. 500 parts of ergot yield from 70 to 80 of ergotin. From his results, it would appear that water must be the best menstruum for extracting the active principles of ergot of rye.

ADULTERATIONS.—Plaster of Paris, and common paste artfully coloured, are substituted for, or mixed with ergot of rye; they are difficult of detection. The characteristics of good ergot as given by Wright should, therefore, be attended to.—"Clear and smooth on the surface, not powdery, of a deep purple colour, neither totally black nor light brown, having a full strong odour, breaking clearly, exhibiting a pink blush interiorly, unpunctured by insects, burning with a clear jetting flame, and being of a less specific gravity than water." But Bonjean states that he has found ergot which is white internally, fully as active as that which is pink.

THERAPEUTICAL EFFECTS.—Ergot of rye in single large doses, from ʒij. to ʒviij., produces nausea, pain in the head, and vertigo, generally followed in from twelve to twenty-four hours by delirium and stupor, with dilatation of the pupil and great depression of the pulse. In medicinal doses, from gr. xv. to gr. xl., it exerts a specific influence on the uterine organs, chiefly manifested by a stimulant effect on the muscular fibres of the uterus, exciting them to increased contraction. Ergot of rye is principally used in medicine to accelerate delivery in cases where childbirth is delayed in consequence of feeble or languid contractions of the uterus; to produce the expulsion of the placenta retained from a similar cause; to stimulate the uterus to expel sanguineous clots, hydatids, or polypi; to promote the lochial discharge; and to check leucorrhœa, or hemorrhage from the womb; all of which effects are the results of augmented contractility of the uterus. The power of ergot to produce the catamenial discharge in amenorrhœa is doubted by many, nevertheless in chlorotic amenorrhœa after the administration of ferruginous preparations for some time, I have in many cases employed the infusion with most beneficial results. The circumstances which contraindicate the employment of ergot, in parturition, are want of dilatation of the os uteri, great rigidity of the soft parts, deformity of the pelvis, and mal-presentation. Most practitioners also agree in advising that it should not be administered in the earlier stages of labour, or in first pregnancies. It is now very generally admitted that the administration of ergot of rye during labour endangers the life of the fœtus; and that this depends on the poisonous action of the drug, as evidenced by its effects on the action of the heart both of the mother and child, is shown in a valuable report by Dr. Hardy, in the 27th volume of the first series of the *Dublin Medical Journal*. It is therefore requisite that after the administration of ergot during labour, any change in the action of the fœtal heart should be carefully watched by the employment of the stethoscope, and if the number of the beats be reduced below 110, *with intermissions*, instrumental delivery must be had recourse to, to save the life of the child. The *ergotin* of M. Bonjean is, however, stated by him to be entirely void of the poisonous property, and if such be proved to be the case, this great objection to the employment of ergot will be overcome by the use of it. The effects produced by the continued use of ergot, as an article of food are very singular, and have been fully described by different writers; any detailed account of them, however, would be quite foreign to the scope of this work, I must, therefore, refer the reader to Dr. Wright's excellent treatise in the 52nd and 53rd vols. of the *Edinburgh Medical and Surgical Journal*, and to a recent admirable report on "Convulsive Epidemic Ergotism," by Dr. Lasègue in the 9th volume of the *Archives Générales de Médecine*, May, 1857.

DOSE AND MODE OF ADMINISTRATION.—In powder, which should be always prepared for use; for a woman in labour, the dose is ℈j. repeated every half hour until ʒj. has been taken, unless its effects are sooner produced; for other cases, gr. v. to gr. x. three times a day. It may be administered diffused through peppermint or cinnamon water.

Infusum Ergotæ, D. (Take of ergot of rye, in coarse powder, ʒij.; boiling water, f℥ix. Infuse for one hour in a covered vessel, and strain. The product should measure about eight ounces.)

Dose, during parturition, ⅓rd of this repeated at intervals of half an hour, unless its effects be sooner produced ; for other cases, the dose is f℥ss. to f℥j. ; some aromatic tincture should be added to this preparation and to the next, to conceal their nauseous taste. A decoction may be prepared with the same proportions by boiling for ten minutes and straining.

Tinctura Ergotæ, D. (Take of ergot of rye, in coarse powder, ℥viij. ; proof spirit, Oij. Macerate for fourteen days, strain, express and filter.) This tincture might be more conveniently prepared by percolation. Dose, in slow parturition, fʒss. to fʒj. ; in other cases, min. x. to min. xx.

Tinctura Ergotæ ætherea, L. (Ergot, bruised, ℥xv. ; ether, Oij. ; macerate for seven days, express, and filter.) The dose is the same as of the alcoholic tincture of the Dublin Pharmacopœia.

Ergotin, BONJEAN. Dose, from one grain and a-half to three grains every quarter of an hour during labour ; in other cases this dose may be given three or four times a-day. It may be prescribed in pill made with liquorice powder and mucilage, or dissolved in water and sweetened with syrup of orange flowers or syrup of saffron.

RUTA GRAVEOLENS.—*Rue* (described in the division *Antispasmodics*,) was formerly highly esteemed as an emmenagogue, and even at present is a popular remedy as such ; it is sometimes resorted to for the purpose of procuring abortion. Although it undoubtedly possesses a direct stimulating influence on the uterine organs, this herb is scarcely ever employed in regular practice in the present day, for any of the purposes for which this class of remedies is administered.

SABINA, D. L. E.— *Tops, (Tops both fresh and dried,* L.) *of Juniperus sabina. Savin.* A native of the South of Europe, cultivated in this country; belonging to the Natural family *Coniferæ (Pinaceæ,* Lindley), and to the Linnæan class and order *Diœcia Monadelphia.*

BOTANICAL CHARACTERS.— An evergreen, small bushy shrub ; Leaves, very small, ovate, pointed, densely imbricated ; it flowers in April or May, and ripens its fruit, a dark purple *galbulus* or berry about the size of a currant in autumn.

PHYSICAL PROPERTIES.—As met with in the shops, savin consists of the young tops and their attached leaves ; in the fresh state they are of a bright green colour, have a heavy, peculiar, terebinthinate odour, and a bitter nauseous taste. When dry their colour is yellowish-green, and their odour much weaker.

CHEMICAL PROPERTIES.—Savin tops consist of resin, volatile oil, gallic acid, extractive, &c. The medicinal properties are due to the volatile oil, which may be obtained by the processes of the Colleges, ℔ij. of the tops yielding f℥v. of oil; it is limpid and nearly colourless, having the odour of the plant, and a hot, acrid taste; its density is 915, and its composition C^{10} H^{8}, being isomeric with oil of turpentine. Savin communicates its odour and taste to water and to alcohol; the alcoholic tincture is of a bright green colour.

THERAPEUTICAL EFFECTS.—Savin is a powerful stimulant to the uterine organs, and is employed as an emmenagogue with much benefit, in amenorrhœa and chlorosis depending on torpid or deficient action of the uterine system. In consequence, however, of its poisonous properties, it should be used with caution; its employment is contraindicated where there is the least tendency to irritation or inflammation of the uterus or any of the pelvic viscera. Savin is the drug usually resorted to by the public for the purpose of producing abortion, but this result cannot be effected except at the risk of the life of the mother.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form, the dose is from gr. v. to gr. xv.

Oleum Sabinæ, D. L. E. Obtained from the tops according to the general process for obtaining volatile oils, as directed in the Dublin and Edinburgh Pharmacopœias; see page 201. It is an article of the Materia Medica in the last edition of the London Pharmacopœia. Dose, from min. ij. to min. vj.

Infusum Sabinæ, (Fresh Savin tops, ℥j.; boiling water, f℥viijss.; macerate for one hour in a covered vessel and strain.) Dose, f℥ss. to f℥j.

In cases of poisoning with savin, emetics should be first employed to remove the poison from the stomach; and afterwards opiates and demulcents, to be followed by general antiphlogistic treatment.

SODÆ BIBORAS.—*Borax* (described in the division *Astringents*), though not ordinarily employed in medicine as an emmenagogue, possesses a powerfully stimulant action on the uterine organs. It is sometimes used empirically to cause abortion, an effect which its incautious administration in regular practice has in more than one instance produced.

CHAPTER XI.

EMMOLIENTS.

(Demulcents ; Relaxants.)

EMOLLIENTS may be defined, substances which diminish the vital tone or cohesion of the solid tissues, and thereby render them more lax and flexible ; or which, by diminishing acrimony, protect the sensible surfaces of the body from the action of acrid matter, and consequently from the injurious effects which might result therefrom. This division of medical agents has been stated by many writers to act merely mechanically, lubricating and softening the parts to which they are applied, or sheathing them from the action of matters which are capable of irritating them. But this explanation cannot possibly apply to those substances which, when introduced into the stomach, operate on remote parts of the body. Emollients, therefore, seem to act either directly on the part with which they are placed in contact, or indirectly through the medium of the circulation. They are principally employed in the treatment of inflammations either general or local, in painful ulcerations, in diseases of the urinary organs, and in poisoning with acrid substances ; but in all these cases they are used only to alleviate symptoms. Of the non-medicinal substances employed as emollients, warm water is the most important, and the higher the temperature at which it can be applied without the actual production of pain, the greater will be its emollient power ; for this reason, it will be found of most advantage when employed in the form of vapour.

ADEPS SUILLUS, D. ADEPS, L. AXUNGIA, D. E.—*Fat of Sus scrofa ; Hog's-lard*, D. E. *Prepared fat of Sus scrofa*, L. *Axunge. Sus scrofa*, the common hog, belongs to the class *Mammalia*, order *Pachydermata*. The fat is usually taken from about the loins, from the omentum and from the mesentery, and is melted and strained to separate the membranes.

PREPARATION.—Lard as sold for general use usually contains salt, which has been added to prevent it from becoming rancid ; consequently to prepare it for medical purposes, the following formula is given in the *Dublin Pharmacopœia* :—*Adeps suillus* *præparatus.* "Take of lard of commerce, any convenient quantity: melt it in twice its weight of boiling water, stirring the mixture constantly; then set the mixture aside to cool, and separate the lard when it has solidified."

PHYSICAL PROPERTIES.—Axunge is a white, solid, fatty matter, with a very faint odour, and a mild sweetish taste. Specific gravity, ·881.

CHEMICAL PROPERTIES.—It is composed of 38 per cent. of *stearin* and *margarin*, and 62 of *oleïne* or *elaïne*. It melts at about 85° F. into a clear transparent liquid, which if water be present is whitish or milky; exposed to the air axunge undergoes a process of decay, becoming *rancid*, when it acquires a peculiar unpleasant odour and acrid properties; in this state it is unfit for medical purposes.

THERAPEUTICAL EFFECTS.—Axunge is not used in medicine internally, its action on the body is nutritive and emollient. As an external agent it is employed as a basis for ointments, cerates, and liniments.

Ceratum Galeni, PARIS CODEX. (Oil of sweet almonds, f℥xvj.; white wax, ℥iv.; rose water, f℥xij.; liquefy the wax in the oil in an earthenware vessel with a gentle heat; pour the mixture into a marble mortar, warmed, and stir constantly until nearly cold; then incorporate the rose water, adding it in small quantities while beating up the cerate continuously and briskly.) *Cold Cream.* Besides the above, which is the French officinal form, numerous other formulæ for its preparation are contained in druggists' receipt books. Cold cream forms an excellent basis for ointments, especially in the treatment of cutaneous diseases, with many of which *greasy* applications disagree.

Ceratum Lauro-Cerasi, AUTHOR. (Oil of sweet almonds, f℥xvj.; white wax, ℥iv.; cherry laurel water [Dublin Pharmacopœia], f℥viij.; prepare as directed for *cold cream* in the last formula.) This preparation will be found most useful for allaying irritation in many diseases of the skin.

ADEPS OVILLUS. SEVUM, L. E.—*Fat of Ovis aries; Suet*, E. *Prepared fat of Ovis aries*, L. *Mutton suet. Ovis aries*, the sheep, belongs to the class *Mammalia*, and order *Ruminantia*. The fat is selected from the neighbourhood of the kidneys, melted, and strained to separate the membranes. Mutton suet is nearly similar in physical and chemical properties to axunge, and is employed for the same purposes; it is sometimes preferred to axunge in consequence of its greater consistence and higher melting point.—It has been omitted from the last edition of the Dublin Pharmacopœia.

ALTHÆA, L. ALTHÆA OFFICINALIS, FOLIA ET RADIX, E.—*The root (leaves and root, E.) of Althæa officinalis. Common Marsh-*

mallow. An indigenous plant, belonging to the Natural family *Malvaceæ,* and to the Linnæan class and order *Monadelphia Polyandria.*

BOTANICAL CHARACTERS.—Stem, two to three feet high, downy; Leaves, heart-shaped, exquisitely soft and pubescent; Flowers, on axillary stalks, large, pale rose-colour.

PHYSICAL PROPERTIES.—The roots are fusiform, from 12 to 18 inches long, about the thickness of the finger, yellowish externally, white and fibrous within; the odour is faintly nauseous, the taste sweet, and very mucilaginous. The leaves have a weaker odour, and a less mucilaginous taste.

CHEMICAL PROPERTIES.—The roots consist of gum, uncrystallizable sugar, starch, yellow colouring matter, *asparagin,* albumen, &c. They yield their mucilaginous properties to water.

THERAPEUTICAL EFFECTS.—Marsh-mallow root is one of the most commonly employed emollients on the continent, but is not much used in this country. As an internal remedy it is given in inflammation of mucous membranes, as in gonorrhœa, cystitis, nephritis, bronchitis, &c., either alone or as a vehicle for other medicines. Externally, the leaves are generally employed in the acute phlegmasiæ in the form of decoction or cataplasm.

DOSE AND MODE OF ADMINISTRATION.—Only used in the following forms:—

Mistura Althææ, E. (Dried root of althæa officinalis, ℥iv.; raisins freed of the seeds, ℥ij.; boiling water, Ov.; boil down to Oiij.; strain through linen or calico; and when the sediment has subsided, pour off the clear liquor for use.) Dose, f℥j. to f℥ij. frequently repeated.

Syrupus Althææ, L. E. ("Althæa, sliced, ℥iss.; sugar, ℔iij. or a sufficiency; distilled water, Oj.; rectified spirit, f℥iiss. or a sufficiency; macerate the althæa in the water for 12 hours; express the liquor and strain through linen. Then add to the strained liquor twice its weight of sugar, and dissolve with a gentle heat. Finally when the syrup is cold, add the rectified spirit in the proportion of f℥ss. to each f℥j.," L. "Fresh althæa root, sliced, ℥viij.; boiling water, Oiv.; pure sugar, ℔iiss.; boil the root with the water down to Oij.; strain and express strongly through calico; let the impurities subside; and dissolve the sugar in the clear liquor with the aid of heat," E.). This syrup does not keep well. The dose is from f℥ss. to f℥j.

INCOMPATIBLES.—Iodine; and tincture of the sesquichloride of iron.

AMYGDALÆ DULCES, D. E., ET, AMYGDALÆ AMARÆ, E. AMYGDALA *(Jordanica),* L.—*Kernels of the fruit of Amygdalus communis,* var. *dulcis,* D. *Kernels of the two varieties of Amygdalus communis,* E. *Seed of Amygdalus communis,* var. *dulcis,* L. *Sweet almonds; and bitter almonds,* E. *Jordan Almonds,* L.

AMYGDALÆ OLEUM, L.—*Oil expressed from the seeds of Amygdalus communis*, vars. *amara et dulcis.*

The almond tree is a native of Syria and Barbary; but grows freely throughout the south of Europe; it belongs to the Natural family *Rosaceæ (Drupaceæ,* Lindley), and to the Linnæan class and order *Icosandria Monogynia.*

BOTANICAL CHARACTERS.—A small tree, with acuminate, serrulate leaves, petiolate; Gland, on the petioles of the bitter almond variety, on the leaves of the sweet almond; Flowers, sessile, appearing before the leaves, white, or rose-coloured; Fruit, an ovoid drupe, leathery, with a longitudinal furrow where it opens when ripe, containing a hard rough shell *(putamen)* marked with pits or furrows, within which is the seed or kernel.

PHYSICAL PROPERTIES.—Sweet almonds vary in size from half an inch to above an inch in length, and are about three-eighths of an inch in breadth; they are oblong, compressed, and pointed at one end; the *perisperm* or outer covering is reddish-brown covered with a yellowish dust; the parenchyma or *episperm* is white, hard and oleaginous, inodorous, having a sweet bland taste. Bitter almonds are generally smaller, they are characterized by their bitter taste, and peculiar odour when rubbed with water. Several sorts of sweet almonds are met with in commerce, the principal of these are Jordan and Valentia almonds; the former come from Malaga, and are the most esteemed; they are longer and more pointed than the latter, which are brought from Valentia. Jordan almonds are specially directed to be employed by the London Pharmacopœia, as from their shape they are not liable to be confounded with the bitter almond. Their characters according to the same Pharmacopœia are as follow: "oblong, more than an inch in length, of a cinnamon colour externally, with an agreeable sweet taste." Bitter almonds are imported from Mogadore.

CHEMICAL PROPERTIES.—Sweet almonds consist of fixed oil, emulsin, liquid sugar, gum, &c In addition to these the bitter almond contains a peculiar principle named *amygdalin,* which, when brought in contact with water, from a mutual re-action between it and the emulsin, generates an essential oil, which will be more particularly described hereafter, (see *Sedatives*). The fixed oil, *Oleum Amygdalæ,* L., is an article of the Materia Medica in that pharmacopœia; in obtaining it the almonds are expressed without heat, and for this purpose either sweet or bitter almonds may be employed; the latter as being cheaper are generally used; 1 cwt. of almonds yields from 48 to 52 lbs. of oil. It is a bland, pale-yellow, inodorous, very liquid oil, lighter than water, its density being about ·920; it consists of 76 per cent. of *oleïne,* and 24 of *margarine;* it requires 6 parts of boiling, or 25 of cold alcohol for its solution; but is very soluble in ether.

THERAPEUTICAL EFFECTS.—Sweet almonds are nutritive and emollient; they should be *blanched* before being used, that is, deprived of the husk or pellicle, as from its acridity it has been known to produce nausea and irritation of the stomach and bowels, in some instances followed by an eruption on the skin. In medicine the preparations of the sweet almond are used as emollients, chiefly in inflammation of the genito-urinary mucous membrane, to lessen the acrimony of the urine, and with the same intention in calculous affections. The oil is seldom given internally, according to some it possesses mildly laxative properties; externally it is used for frictions, and as an ingredient in some soaps.

DOSE AND MODE OF ADMINISTRATION.—Employed only in the following forms:—

Confectio Amygdalæ, L. *Conserva Amygdalarum*, E. ("Sweet almonds, ℥viij.; powdered gum arabic, ℥j.; sugar, ℥iv.; pound the almonds previously blanched by maceration in cold water, and then rub them through a fine wire sieve; add the other ingredients and pound them together until all are incorporated. This confection may be kept unchanged longer if the almonds previously blanched, dried, and rubbed to the finest powder are mixed with the acacia and sugar, separately powdered; and the mixed powder kept in a close vessel," L. "Sweet almonds, ℥viij.; powder of gum arabic, ℥j.; pure sugar, ℥iv.; blanch the almonds by maceration and peeling, and beat them with the gum and sugar into a uniform pulpy mass," E.). This confection is only used for the preparation of the emulsion.

Mistura Amygdalæ, D. L. *Mistura Amygdalarum*, E. ("Take of sweet almonds, five drachms; refined sugar, two drachms; gum arabic, in powder, one drachm; distilled water, eight ounces; steep the almonds in hot water for five minutes, and, having removed their external coat, beat them with the sugar and gum, in a mortar, into a coarse powder; add the water gradually and triturate so as to form a uniform mixture. Finally strain through muslin," D. "Almond confection, ℥iiss.; water, distilled, Oj.; add the water to the confection gradually, triturating until they are mixed; and strain through linen," L. "Almond confection, ℥ij.; water, Oij.; add the water gradually to the confection, triturating constantly, and strain through linen. Or it may be prepared as follows:—Sweet almonds, ℥j. ʒij.; pure sugar, ʒv.; mucilage, f℥ss.; water, Oij; blanch the almonds, beat them to a smooth pulp in an earthen-ware mortar, first with the sugar, then with the mucilage; add the water gradually, constantly stirring, and strain through linen or calico," E.). Generally employed as a vehicle for other medicines in doses of f℥j. or f℥ij. Acids and alcohol, and of course tinctures, are incompatible with almond emulsion.

AMYLUM, D. L. E.—*Fecula of the seeds of Triticum æstivum*, D.; *of Triticum vulgare*, L. E. *Starch. Wheaten starch.* The common wheat, *Triticum vulgare*, of which *Triticum æstivum* is a variety, is a native of the country of the Baschkirs, and is cultivated throughout Europe. It belongs to the Natural family *Gramineæ*, and to the Linnæan class and order *Triandria Digynia.*

BOTANICAL CHARACTERS.—Culms, simple, glaucous, jointed; Leaves, alternate, linear, smooth, of a glaucous-green colour; Flowers, glumaceous, at the extremity of the culm; Seed (grain) ovoid, yellowish, with a longitudinal furrow.

PREPARATION.—The fecula or starch forms nearly 70 per cent. of wheaten flour. It is procured by steeping the flour in water for one or two weeks until it becomes sour, drawing off the supernatant liquor; washing the residuum on sieves with repeated portions of the water, allowing the liquor which passes through to deposit the starch in large vats; and finally draining the deposited starch, and drying it in a stove.

PHYSICAL PROPERTIES.—Starch usually occurs in the form of small, irregular, hexagonal prisms; white, pulverulent, unalterable in the air, crackling under the fingers when lightly pressed, inodorous, and insipid. Viewed on the field of the microscope it is found to consist of various-sized transparent particles, rounded or angular, uneven on the surface.

CHEMICAL PROPERTIES.—The ultimate analysis of starch is $C^{12} H^{10} O^{10}$. Starch is insoluble in cold water, but may be suspended in it by trituration; it is also insoluble in alcohol and ether. In water near the boiling point it dissolves almost completely, and if sufficiently concentrated forms an opaque jelly, which becomes more consistent as it cools. By roasting starch, it is rendered somewhat analogous to gum, and is then soluble in cold water. If a mixture of 20 parts of starch-paste, and 1 part of strong infusion of malt be heated together to about 120° F. until iodine no longer turns it blue, and strong alcohol be then added, a perfectly soluble gum is precipitated as a thick syrup. This gum is termed *Dextrine* from its power of causing the plane of polarization to deviate to the right. If the application of heat to the above mixture be continued longer, the dextrine is converted into *Glucose* or grape sugar. With a cooled decoction of starch, iodine forms a rich blue compound *(iodide of starch)*, which varies in the intensity of the colour as the iodine or starch predominates.

ADULTERATIONS.—Starch is often adulterated with sulphate of lime; the fraud may be detected by incineration, the starch being burned away and leaving the fixed sulphate. Its weight is often increased by the presence of superabundant moisture, which may be discovered by drying starch in a vapour bath, and ascertaining the loss of weight, which should not be more than ten or twelve per cent. Potato starch is sometimes sold for wheaten starch; this fraud may be readily detected by the microscope, the particles of the former being much larger than those of the latter; it may be also discovered by triturating for a short time a small quantity of the suspected specimen with water in an *agate* mortar, and adding to the strained solution a few drops of tincture of iodine:—if it be pure wheaten starch, a pale yellow colour only will be produced; but if potato starch be present, the coloration will be deep blue.

THERAPEUTICAL EFFECTS.—Wheaten starch is employed in medicine, chiefly in the form of decoction, as an emollient enema in dysentery, diarrhœa, or other inflammatory affections of the abdominal viscera; it is also used as a vehicle for more active remedies, and for suspending drugs which are administered in a state of powder. Externally, starch in fine powder is applied to excoriated parts, and for preventing the formation of bed sores, also as a basis for dusting powders in the treatment of cutaneous affections.

DOSE AND MODE OF ADMINISTRATION.—*Mucilago Amyli*, D. E. *Decoctum Amyli*, L. ("Starch, ʒiv. ; water, Oss. ; triturate the starch with the water gradually added, then boil for a few minutes," D. "Starch, ʒiv. ; water, Oj. ; triturate the starch with the water added gradually, and boil for a few minutes," L. E.) Used in the form of an enema either alone or as a vehicle for other remedies.

AVENA, D. L. E.—*The seeds (freed from the husks,* L.*) of Avena sativa. Oatmeal. Avena sativa,* the common oat, is generally cultivated over the whole of Europe ; it belongs to the Natural family *Graminaceæ,* and to the Linnæan class and order *Triandria Digynia.*

BOTANICAL CHARACTERS.—Root annual ; Culm, from two to three feet high ; Leaves, linear, acute ; Flowers, glumaceous, disposed in loose, terminal, somewhat pendant panicles ; Seeds, more or less elongated, pointed at both extremities, convex at one side, marked with a longitudinal furrow on the other ; white, in some varieties black.

PREPARATION.—Oats deprived of their husks are called *Groats*, which, when coarsely ground, constitute *Oatmeal ;* the husks with some adhering starch from the groats are sold under the name of *Seeds*. These different preparations are too well known to need description.

PROPERTIES.—Oats contain 66 per cent. of meal, and 34 per cent. of husk or *Bran*. The dried meal consists of starch, mucilage, sugar, albumen, and lignin, but no gluten. Oatmeal or groats boiled with water, in the proportion of about ℥iij. to Oiij. of water down to one-half, constitutes *Gruel*, a light article of diet for the sick or convalescent. If a larger proportion of the coarsely ground meal be used, it is called *Porridge*, a principal article in the dietaries of hospitals and charitable institutions, and forming a staple article of food in Scotland and the North of Ireland.

THERAPEUTICAL EFFECTS.—Oatmeal is nutritive and emollient; it is employed in medicine internally only in the form of *gruel* above referred to. Externally it is sometimes used in the form of poultice, prepared as *porridge*, but with less boiling.

CANNA EDULIS, D.—*The fecula of the root. Tous les Mois.* The Dublin College has introduced this excellent fecula into the Materia Medica list of their last pharmacopœia, where it is stated that the above plant is supposed to yield it ; most botanical authorities however, ascribe it to the *Canna coccinea.* Both plants belong to the Natural family *Marantaceæ.*

PROPERTIES.—Tous-les-Mois is in the form of a white powder, presenting a much more glistening aspect than either potato-starch or arrow-root, in consequence of the larger size of the globules of which it is composed, many of them being the 300th part of an inch in length, and some even so much as the 200th (Christison). It possesses the general properties of wheaten starch already described, but forms a much firmer jelly with boiling water, being in this respect equal to arrow-root.

THERAPEUTICAL EFFECTS.—As an article of diet for delicate persons or invalids, it takes the same position as arrow-root, although it at present bears a much lower price in the English market. Christison states that it is more esteemed and dearer than true arrow-root in many of the West India Islands. It is prepared for use in the same way as arrow-root. (See page 248).

CERA, L. CERA FLAVA, D. E.—*Yellow wax ; Unbleached bees'-wax ; a secretion of the Apis mellifica or Honey-bee,* D. *Prepared honey-comb of Apis mellifica,* L. *Waxy secretion of Apis mellifica,* E.

CERA ALBA, D. L. E.— *White wax ; Bleached bees'-wax.* Wax is a product of many vegetables ; but the wax employed in medicine is a secretion of certain glands—*wax pockets,* situated on the abdomen of the common bee ; it is used by the insect for constructing the cells of the honey-comb.

PREPARATION.—It is obtained from the comb, after the honey has been removed by dripping and expression, by melting it in water and straining it so as to free from impurities ; in this state it constitutes yellow wax. White wax is procured from this, by melting and agitating with water, and finally bleaching in thin ribbons in the open air ; the process being repeated until it loses all colour and odour.

PHYSICAL PROPERTIES.—*Yellow wax* is in large cakes of the shape of the mould in which it has been allowed to cool ; it has a gamboge-yellow colour, a dull lustre, a peculiar sweet odour, and a faint greasy taste ; specific gravity, when pure, ·972. *White wax* is in white cakes, with a faint yellow tinge ; it is feebly translucent, inodorous, and insipid ; specific gravity same as that of yellow wax.

CHEMICAL PROPERTIES.—Recent chemical analysis has shown that wax is a rather compound substance, containing two acids, with other matters interesting to the chemist, as adding to the analogical list of homologous alcoholic compounds. The acids have been named *Cerotic acid* ($C^{54} H^{54} O^{4}$), Brodie, and *Melisic acid* ($C^{60} H^{60} O^{4}$). Yellow wax contains a little more carbon and a little less oxygen than white wax (Lewy). Wax is insoluble in water, and in alcohol and ether when cold ; but is soluble in boiling alcohol and ether, in the fixed oils and in oil of turpentine. Yellow wax melts at 145° and white at 158°, both are inflammable, burning without any residuum when pure. Wax combines with fats and resins when heated with them.

ADULTERATIONS.—Wax is adulterated with starch, which may be detected by the action of tincture of iodine on cooled water in which it has been boiled; with resin, which may be dissolved out by alcohol; with fat or grease, which emit a peculiar odour when burned; and with flour of sulphur and other earthy or metallic substances, which are left when wax is dissolved in oil of turpentine.

THERAPEUTICAL EFFECTS.—Wax acts as an emollient, and was formerly employed as such in ulcerations of the intestines, but at present it is not used as an internal remedy. As an external agent it forms the basis of all cerates, and is an important constituent of many ointments and plasters.

PHARMACEUTICAL PREPARATIONS:—

Unguentum Ceræ albæ, D. (White wax, ℔j.; prepared lard, ℔iv.; melt them together with a gentle heat, and stir constantly until the mixture concretes.) In the last edition of the Dublin Pharmacopœia this preparation is made the basis of all the ointments with a few exceptions.

Ceratum, L. *Ceratum simplex*, E. ("Wax, ℥xx.; olive oil, Oj.; add the oil to the wax melted and mix," L. "Olive oil, 6 parts; white wax, 3 parts; spermaceti, 1 part; heat the oil gently, add the wax and spermaceti, stir the whole briskly when it is fluid, and continue the agitation as it cools," E.) These preparations, commonly known as *simple cerate*, are used as mild and cooling dressings.

Emplastrum simplex, E. (Wax, ℥iv.; suet, ℥ij.; resin, ℥ij.; melt them together with a moderate heat, and then stir the mixture briskly till it concretes on cooling.) Chiefly used for preparing cantharides plaster.

Linimentum simplex, E. (Olive oil, 4 parts; white wax, 1 part; dissolve the wax in the oil with a gentle heat, and stir well, as the fused mass cools and concretes.) An emollient liniment.

CETACEUM, D. L. E.—*Spermaceti. A peculiar concrete substance obtained chiefly from the head of the Physeter macrocephalus*, D. *A concrete prepared from the oily matter of the head of Physeter macrocephalus*, L. *Cetin of Physeter macrocephalus, nearly pure*. E. *Physeter macrocephalus*, the great-headed cachalot, is a gregarious whale, inhabiting the Pacific Ocean, and the Indian and Chinese seas; it belongs to the class *Mammalia*, order *Cetacea*.

PREPARATION.—Although spermaceti is found in various parts of the body of the animal mixed with common fat, it is chiefly obtained from a large, triangular-shaped reservoir, existing in the head over the surface of the upper jaws, in which it is contained dissolved in oil, forming a milky-looking, oleaginous fluid. It is separated from the oil by boiling in water, from which the spermaceti crystallizes as it cools; it is then purified by being re-melted in a weak solution of potash and the impurities skimmed off, and finally melted a third time by the agency of steam, and cooled slowly in thin moulds.

PHYSICAL PROPERTIES.—Spermaceti occurs in various-sized crystalline masses, beautifully white, which are formed of an infinite number of small brilliant scales; it is soft and unctuous to the touch, inodorous, and insipid. Specific gravity, ·943.

CHEMICAL PROPERTIES.—It is composed of *cetine* and a small quantity of a liquid oil from which it may be easily purified. Cetine when melted or dissolved in alcohol forms fine crystals.

Spermaceti may be readily pulverised by the addition of a few drops of alcohol, or of almond oil; it is fusible at 112°, combustible, insoluble in water, and only slightly soluble in alcohol, even at a boiling temperature; it combines with fixed or volatile oils, and with melted fats.

THERAPEUTICAL EFFECTS.—Spermaceti is an emollient and demulcent, but at present is not used internally. Externally, it is employed as an ingredient in various cerates and ointments.

PHARMACEUTICAL PREPARATIONS:—

Unguentum Cetacei, D. *Ceratum Cetacei*, L. (" Spermaceti, ℔j.; white wax, ℔ss.; prepared lard, ℔iij.; melt them together with a gentle heat, and stir constantly until cold," D. " Spermaceti, ℥ij.; white wax, ℥iij.; olive oil, Oj.; add the oil to the spermaceti and wax melted together, and stir with a spatula until they are cold," L.) An emollient and cooling dressing for raw and blistered surfaces.

Unguentum Cetacei, L. (Spermaceti, ℥v.; white wax, ʒxiv.; olive oil, Oj. or a sufficiency; being melted together with a slow fire, stir constantly until they become cold.) Similar to the last, but a softer preparation.

CUCUMIS SATIVUS.—*The Cucumber.* This plant, commonly cultivated throughout Europe as a cooling vegetable, is only used in medicine for the preparation of an emollient and refrigerant ointment. It belongs to the same Natural family and Linnæan class and order as the Colocynth. Several processes for preparing cucumber ointment have been proposed by the French pharmaceutists, the following is that of MM. Henry and Guibourt:—

Ungentum Cucumis. Cucumber Pomade. (Prepared lard, ℔ij.; veal suet, ℔ss.; melt together with a gentle heat, and as soon as the mixture is nearly cold, add gradually f℥xxiv. of the expressed juice of fresh cucumbers, mixing and bruising well with the hand; set aside for twenty-four hours; then pour off the juice and replace it by a similar quantity of fresh juice, and repeat this process ten times, adding fresh juice each time. As soon as the pomade has acquired a well-marked odour of the cucumber, melt in a water-bath, and add an ounce of finely-powdered starch, which will combine with the water and precipitate it. Allow the entire to settle, and then pour off the pomade into small vessels.) To render it more white and smooth, the French pharmaciens usually prepare it for use by melting again in a warm-bath, and beating for two hours or even longer with a wooden spatula, but when submitted to this treatment it does not keep fresh for a longer period than a month; while in the former case it will keep for a year, or even longer, in a cool place.

As the foregoing process has frequently failed in the hands of compounders in this city, I think it well to append the following, published by Mr. Proctor in the American Journal of Pharmacy:— (" Green cucumbers, (suitable for table use,) 7 pounds; lard, (the purest and whitest,) 24 ounces; veal suet, (selected,) 15 ounces. The unpared cucumbers, after being washed, are reduced to a pulp by grating, and the juice expressed and strained. The suet is cut in small pieces, and heated over a salt water bath until the fat is fused out from the membranes ; the lard is then added, and when liquefied is strained through muslin into a wide-mouthed earthen vessel capable of holding a gallon, and stirred until it commences to thicken, when one-third of the cucumber juice is added, and beaten with the ointment by means of a wooden spatula until its odour has been almost wholly extracted. The part that separates by standing is decanted, and the other two-thirds consecutively incorporated and decanted, in the same manner. The jar is then closed, covered, and placed in a water bath until the fatty matter entirely separates from the exhausted juice. The green albuminous coagulum which floats on the surface is then skimmed off, and the jar put aside in a cool place that the ointment may solidify. The crude ointment is then separated from the watery liquid on which it floats, melted, and strained ; a part into a jar and closely sealed for keeping ; the remainder into a mortar, and triturated with a little rosewater until it is very white and creamy, for present use. It is usual to keep this ointment in glass jars covered with rosewater, to prevent access of the air.")

This ointment when well prepared is of a pearl white colour and a tolerably firm consistence, with an agreeable odour of fresh cucumbers. It is an excellent basis for external applications which it is wished to use in the form of ointment, and especially beneficial in the treatment of diseases of the skin. Employed alone, it is also an admirable soothing and healing preparation, very serviceable in intertrigo and other cutaneous irritations.

CYDONIUM, L.—*Quince-seeds. Seeds of Cydonia vulgaris.* The Quince tree is a native of the south of Europe ; belonging to the Natural family *Rosaceæ (Pomaceæ,* Lindley*)*, and to the Linnæan class and order *Icosandria Pentagynia.*

BOTANICAL CHARACTERS.—A small, much branched tree ; Leaves, ovate, obtuse, their under surface tomentose ; Flowers large, solitary or few, pale rose colour ; Fruit, a variously-shaped pome, yellow, austere, but very fragrant, containing many seeds.

PHYSICAL PROPERTIES.—Quince seeds are ovate, pointed, plano-convex, of a reddish-brown colour, inodorous, leaving a bitter impression on the palate when chewed for some time.

CHEMICAL PROPERTIES.—The episperm of the seed contains a large quantity of mucilage named by Pereira, *Cydonin.* The substance of the seed contains, besides other matters, emulsin and fixed oil, consequently emitting when moistened the bitter almond odour. The mucilaginous principle is dissolved out by boiling water.

THERAPEUTICAL EFFECTS.—Quince seeds are only employed in medicine for the mucilage which they contain, the decoction has been recommended as an emollient application to erysipelatous surfaces, and to aphthous ulcerations of the mouth.

PHARMACEUTICAL PREPARATION.—*Decoctum Cydonii*, L. (Quince seeds, ℥ij.; distilled water, Oj.; boil for ten minutes over a slow fire, and strain.) Never used internally. It does not keep well.

INCOMPATIBLES.—Alcohol; acids; most metallic solutions; and tincture of galls.

FARINA, D. L. E.—*Flour of the seeds of Triticum æstivum*, D., *of Triticum vulgare*, L. E. *Wheaten flour*, (See *Amylum).*

Flour is employed in medicine for dusting excoriated or burned parts. In the form of bread—PANIS, L.—it is used as a basis for making pills; but as bread always contains salt, it should not be employed for that purpose with substances which are decomposed by chloride of sodium, as the salts of silver, &c.

FICI, D. E. FICUS, L.—*Figs. The dried fruit (prepared fruit,* L.) *of Ficus carica.* A native of Asia, and the south of Europe; belonging to the Natural family *Urticaceæ (Moraceæ*, Lindley), and to the Linnæan class and order *Polygamia Diœcia.*

BOTANICAL CHARACTERS.—A small tree, with large, cordate, palmate leaves; Flowers numerous, pedicellated, inclosed within a fleshy receptacle, which is umbilicated and nearly closed at the apex, hollow within; Drupe or utricle one-seeded, sunk into the pulpy receptacle.

PHYSICAL PROPERTIES.—Figs consist of the fleshy, pyriform receptacle, containing within numerous, small, crustaceous seeds. When fully ripe they are dried in the sun, and packed in drums, boxes, or baskets, in which forms they are imported; those in drums or boxes from Smyrna *(Turkey figs)*, those in baskets from Spain and Portugal *(Portuguese figs)*. Dried figs are too well known to require description.

CHEMICAL PROPERTIES.—Dried figs consist of 62 per cent. of *sugar of figs*, with gum, fatty matter, extractive and salts. They yield their sugar and gum to boiling water.

THERAPEUTICAL EFFECTS.—Figs are nutritive and emollient, and in large quantity gently laxative; they are more employed as an article of the table than in medicine. They enter into the composition of the *compound decoction of barley* and the *confection* or *electuary of senna* of the London and Edinburgh Pharmacopœias. Roasted figs are applied to gum boils to promote suppuration.

GLYCERINA, D.—*Glycerine. A sweet principle produced during saponification.*

PREPARATION.—Glycerine is an article of the Materia Medica introduced into the last edition of the Dublin Pharmacopœia. It is formed in the preparation of the Emplastrum lythargyri by the reaction of the oxide of lead on the olive oil; during the process an insoluble soap of lead is thrown down, and the glycerine is left in the aqueous liquid. The latter should be treated with sulphuretted hydrogen to remove any lead that may remain in it, digested with animal charcoal, filtered and evaporated in vacuo at the temperature of the air to the consistence of a syrup. This is, however, a wasteful and expensive process, and cannot be made to yield a product free from a disagreeable odour. The following excellent method of preparing glycerine originated with Dr. Morfit, an American chemist:—"Take 100 pounds weight of oil, tallow, lard, or "stearin" (pressed lard), place it in a clean iron-bound barrel, and melt it by the direct application of a current of steam. While still fluid and hot, add 15 pounds of lime previously slacked and made into a milk with 2½ gallons of water, then cover the vessel, and continue the steaming for several hours, or until the completion of the saponification. This is known when a sample of the resulting and cooled soap gives a smooth and lustrous surface on being scraped with the finger nail, and breaks with a cracking noise; it is now allowed to cool and then strained through cloth. The strained liquor which contains only the glycerine and excess of lime must be carefully concentrated by steam heat. A portion of the lime is thereby deposited, and the remainder is to be removed by treating the evaporated liquid with a current of carbonic acid gas, boiling by steam heat to convert any soluble bicarbonate of lime that may have been formed into the insoluble neutral carbonate, allowing the whole to settle, decanting or straining off the clear supernatant liquid, and further evaporating as before, if necessary, to drive off any excess of water." Nearly all the glycerine, however, that is at present met with in the English market is the produce of the great candle works of Price and Co. of London, who, from the extensive nature of their manufactures, are enabled to supply it at a moderate price, of great purity. But it is to be feared that should the use of glycerine in making printing paper, to obviate the necessity of damping the paper before being printed on, be successful, the high price it will necessarily attain must interfere with the general use in medicine it is now likely to acquire.

PHYSICAL PROPERTIES.—Glycerine is a syrupy liquid, with a sweetish taste; inodorous when properly prepared; it is usually met with in the shops of a pale yellow colour, but when concentrated by evaporation in vacuo is nearly colourless; then it also acquires somewhat of an acrid taste. Its specific gravity, according to the Dublin Pharmacopœia, is 1·260.

CHEMICAL PROPERTIES.—This substance is the *sweet principle of oils*; in each fat it is united with a different acid, and is consequently regarded by chemists, though a neutral substance itself, as the salifiable base of oils; the various oils being *salts of Glycerine.* It cannot be made to crystallize, nor can it be obtained in a solid state; it dissolves in water and alcohol, but is insoluble in ether. By heat it is volatilized in part, finally becomes dark and is decomposed, yielding a peculiar volatile compound, *acroleïne*, which affects the eyes most powerfully. Exposed to the air it absorbs water; becomes at first yellowish and then brownish, but does not undergo the alcoholic fermentation. The composition of Glycerine is $C^6 H^7 O^5 + HO$.

ADULTERATIONS.—Glycerine cannot be said to be adulterated, though it is often met with in the shops of not very good quality, sometimes from not being kept in a cool place, or in bottles not completely filled. The following tests for its goodness are therefore necessary to be known :—It should be of the prescribed density, colourless or of a faint straw colour, free from odour and from any acrid or burning taste, and should dissolve completely in two volumes of an ethereal alcohol, prepared by mixing together five parts of sulphuric ether and one of alcohol, which solution should be free from the least turbidity in twelve hours after the mixture.

THERAPEUTICAL EFFECTS.—Glycerine has not been much used in medicine internally. It has been administered in phthisis as a substitute for cod-liver oil, but without sufficiently successful results to encourage its further employment. From its harmless nature, it may be prescribed with advantage as a vehicle for the administration of some of the more active medicines, many of which, such as iodine and most of its preparations, quina, tannin, strychnia, veratria, atropia, &c., it dissolves very freely. As an external application it has been employed chiefly in the treatment of cutaneous diseases, for which it was first proposed by Mr. Startin of London. He used it principally in the treatment of eruptions of the scalp, lepra, psoriasis, lichen, inveterate impetigo, and prurigo. Its effects seem to depend on its property of keeping the parts to which it is applied continuously moist : it thus allays irritation, and moreover prevents the too rapid drying of the skin, which is apt to attend the use of alkaline washes. My own experience of glycerine as an addition to ointments or lotions in the treatment of skin diseases is most favourable, but it is not adapted for eruptions attended with much discharge, as it keeps the surface too moist. It has been also employed to moisten cotton, when introduced into the ear with the view of acting as an artificial tympanum in cases in which that membrane has been destroyed from any cause ; a plan of treatment now adopted by some aurists. In *pharmacy*, glycerine may be used to prevent pill masses from getting hard, which the addition of a small quantity effects, and also to preserve syrups and extracts. Mr. Schacht has recently proposed to substitute a mixture of glycerine and starch in the proportion of a fluid ounce of the former and twenty grains of the latter, rubbed together in the cold and then heated gradually to about 240° F. constantly stirring, for fats in the prepartion of ointments and cerates, but the hygrometric nature of the compound forms in my opinion an insuperable objection to its use.

DOSE AND MODE OF ADMINISTRATION.—As regards the dose of glycerine for internal employment it does not appear to be more active than simple syrup. Externally, it may be added to lotions, cataplasms, or ointments, in the proportion of from an eighth to a sixteenth part.

GLYCIRRHIZA GLABRA, D. GLYCIRRHIZA, L. GLYCIRRHIZÆ RADIX, E.—*The root of Glycirrhiza glabra*, D. E. *Fresh and* *dried root of Glycirrhiza glabra,* L. *Liquorice.* A native of the South of Europe, now cultivated extensively in England; belonging to the Natural family *Leguminosæ (Fabaceæ,* Lindley), and to the Linnæan class and order *Diadelphia Decandria.*

BOTANICAL CHARACTERS.—Root, long, creeping, succulent; Stem, erect, smooth, 4 to 5 feet high; Leaflets, ovate, retuse, yellowish; Flowers, axillary, racemose, papilionaceous, bluish or purplish.

PREPARATION.—The root is dug up in November, when the plant is three years old, washed, and the smaller fibres cut off; it is imported in large quantities from Spain and Portugal, but that grown in England is most esteemed. It may be kept fresh for many months by covering it with sand in a damp cellar. The London College directs it "to be kept fresh for use buried in dry sand."

PHYSICAL PROPERTIES.—Liquorice root is in cylindrical pieces, from one to two or three feet long, smooth and plump when fresh, wrinkled in the dry state, about the thickness of the little finger, of an umber-brown colour externally, yellow internally; it has a faint earthy odour, and a sweet, mucilaginous, subacrid taste.

CHEMICAL PROPERTIES.—It consists of a peculiar saccharine principle named *glycirrhizine,* albumen, fecula, *asparigin* or a principle analogous to it, some salts, and a thick, acrid, resinous oil. It yields its active principles to boiling water, but as the acrid oil is dissolved out by the aid of heat, the Dublin and Edinburgh Colleges direct cold water to be used for preparing the extract.

ADULTERATIONS.—Liquorice powder is often adulterated on the Continent with a yellow pigment *(French yellow),* which is readily detected, as it effervesces on the addition of hydrochloric acid. Extract of liquorice is generally much adulterated.

THERAPEUTICAL EFFECTS.—Liquorice root is emollient and demulcent; it is chiefly employed in the form of extract or decoction in catarrhal affections; it is also used to give flavour to other medicines. Liquorice powder is employed in pharmacy as a covering for pills, or to give them consistence.

DOSE AND MODE OF ADMINISTRATION.—The fresh root may be chewed *ad libitum.*

Extractum Glycirrhizæ, D. L. E. ("Take of liquorice root, in thin slices, dried and reduced to coarse powder, one pound; distilled water, three pints: the method of preparation is the same as for *Extractum Gentianæ,*" D. "Fresh liquorice root, bruised, lbiiss.; boiling distilled water, cong. ij.; macerate for 24 hours; boil down to cong. j. and strain the liquor while warm; finally evaporate to a proper consistence," L. "Cut liquorice root into small chips, dry it thoroughly with a gentle heat, reduce it to a moderately fine powder, and proceed as for extract of gentian," E.) Extract of liquorice is imported in large quantities from Italy and Spain, in the form of flattened rolls, about five or six inches long, an inch in breadth, and half an inch in thickness, enveloped in bay leaves; in this state it generally contains a large quantity of copper acquired from the boilers in which it is prepared; it is, therefore, usually purified by dissolving in boiling water and inspissating, it then forms *stick or refined liquorice.* It is used as an emollient in coughs and bronchial affections, being allowed to dissolve slowly in the mouth.

Trochisci Glycirrhizæ, E. (Extract of liquorice; and gum arabic, of each, ℥vj.; pure sugar, ℔j.; dissolve them in a sufficiency of boiling water, and then concentrate the solution over the vapour bath to a proper consistence for making lozenges.) For allaying tickling cough caused by irritation of the fauces.

GOSSYPIUM, E.—*Raw Cotton. Hairs attached to the seeds of Gossypium herbaceum.* A native of Asia, and extensively cultivated in America; belonging to the Natural family *Malvaceæ*, and to the Linnæan class and order *Monadelphia Polyandria.*

BOTANICAL CHARACTERS.—Stem, 3 to 12 feet high; Leaves, hoary, palmate, acutely lobed; Flowers, yellow, with a large purple spot at the base of each petal; Capsules, ovate, pointed, about the size of a walnut; Seeds, numerous, imbedded in down, which constitutes the cotton.

PHYSICAL PROPERTIES.—Cotton is in filamentous masses; each filament examined by the microscope is a flattened tube twisted on itself. It is of a pale yellowish-white colour, tasteless and destitute of smell.

CHEMICAL PROPERTIES.—Cotton is a modification of *lignin;* it is highly combustible, and is completely insoluble in water, alcohol, ether, the fixed and volatile oils, and all the vegetable acids.

THERAPEUTICAL EFFECTS.—The only medicinal use made of cotton is in the treatment of blistered surfaces and of burns; it is applied in all stages of the latter, the earlier the better, but if any vesications exist, they should be first opened. The most convenient form for its application is that which is technically known as *French wadding*, and which is prepared for milliners; this should be applied in successive layers, the unstarched side next the burn, so as to completely exclude the air; it should not be removed for five or six days if possible, and then the outer layers only. Some surgeons use a spirituous or turpentine wash in extensive burns before applying the cotton. The method of using cotton as a dressing for blistered surfaces will be described in the next chapter under the head of Cantharides.

If one part of clean raw cotton be steeped for two minutes in about ten parts of a mixture of equal volumes of strong nitric acid (D 1·510) and concentrated sulphuric acid (D 1·840), squeezed, thoroughly washed, and dried very cautiously at a low temperature, certainly not higher than 200°, it is converted into *Gun-cotton*, the *Xyloidine* of chemists, a substance highly explosive and of peculiar properties. This gun-cotton dissolved in sulphuric ether constitutes *Collodium*, an adhesive compound that has been proposed for the re-union of recent incised wounds. It is applied in layers by means of a camel's-hair brush, and drying instantaneously, owing to the evaporation of the ether, a thick coating may be given to any part of the body. Its effects depend on its keeping the exposed surfaces in close contact and preserving them from the air. With the latter view it has been also used in the treatment of some diseases of the skin and of burns, but it is now rarely employed for any of these purposes, experience having proved that its application does not fulfil the expectations of advantage held out by those who first proposed its adoption.

GUMMI ACACIÆ, E. ACACIA VERA, GUMMI, D. ACACIA, L.—*Gum of various species of Acacia*, E. *Gum of Acacia vera; the true white gum-arabic is yielded by Acacia varek (Guillemin); other species contribute to furnish the gum-arabic of commerce*, D. *Gummy exudation from the bark of various species of Acacia, hardened in the air*, L. *Gum arabic. Gum acacia.* The species of the genus Acacia which yield gum are inhabitants of Arabia, Egypt, and Senegal; they belong to the Natural family *Leguminosæ (Fabaceæ*, Lindley), and to the Linnæan class and order *Polygamia Monœcia.* As regards the observations of Guillemin and Perettet, the statement of the Dublin College is incorrect, for they assert that the *Acacia varek* yields white *Senegal* gum.

BOTANICAL CHARACTERS.—Small thorny trees; Leaves, pinnated; Leaflets, linear, 8 to 20 pairs; Flowers, capitate, small, yellow.

PREPARATION.—Gum exudes from the trees either through natural fissures in the bark, or through artificial incisions made into it in the hot season of July and August; it flows in the form of a thick, viscid fluid, which concretes on the tree without losing its transparency; that which flows early in the season is gathered in December, and that which flows later, in March; the first gathering is considered the best.

PHYSICAL PROPERTIES.—Several varieties of gum acacia are met with in commerce; the most commonly known are *Turkey or true Gum Arabic, Barbary Gum, Senegal Gum, East India Gum, and Cape Gum.* Gum arabic occurs in tears or irregularly-shaped pieces, varying in size from a pea to that of a chestnut; it is transparent and brittle, but not readily reducible to fine powder; has a vitreous fracture; a pale reddish-yellow or pure white colour; is inodorous; and has a weak mucilaginous taste. Its specific gravity varies from 1·335 to 1·525. The most transparent and whitish tears are picked out and sold as *picked gum* or *gum of first quality.* The other varieties of gum do not differ essentially from gum arabic; they are usually in larger sized pieces, and of a darker colour; they are inferior in quality to gum arabic, and should not be used for medical purposes.

CHEMICAL PROPERTIES.—Gum arabic consists of 79·4 per cent. of soluble gum *(arabin)*, and 17·6 per cent. of water. Some of the inferior sorts of gum contain a large quantity of insoluble gum *(bassorin).* Its ultimate analysis is $C^{12}H^{11}O^{11}$. Gum is soluble in its own weight of cold or boiling water, forming a viscid solution *(mucilage)*; it is also soluble in vegetable acids; but is insoluble in alcohol, ether, and the fixed and volatile oils. By exposure to heat the water it contains is driven off; but it cannot be fused. Its solution in water reddens litmus paper faintly.

ADULTERATIONS.—The finer qualities of gum arabic are adulterated with the inferior, and these again with the other varieties of gum; but picked gum ought alone to be used in medicine. The powder is very commonly adulterated with starch or flour, either of which may be detected by the action of tincture of iodine on a cooled decoction.

THERAPEUTICAL EFFECTS.—Gum is nutritive, emollient, and demulcent. It is employed in inflammation of the mucous membranes, in gastric irritation, in acrid poisoning, &c. Its chief uses, however, are as a vehicle for more active medicines, for suspending insoluble substances in water, and as a basis for pills in extemporaneous prescriptions. A strong solution has been proposed by Mr. Rhind of Edinburgh, as an application to burns, and in some cases in which I tried it, the pain was much alleviated, and when applied immediately after the accident, the formation of blisters was prevented. Thick mucilage dropped into the eye removes the annoyance occasioned by the presence of fine sand or dust in that organ. Mucilage is extensively used in pharmacy for the extemporaneous preparation of pills, and for compounding mixtures and emulsions. Pills made with mucilage become hard very speedily, and therefore it should not be employed as an excipient in their preparation unless when they are to be used immediately.

DOSE AND MODE OF ADMINISTRATION.—In substance or powder, ʒss. to ʒj., allowed to dissolve slowly in the mouth, in irritation of the fauces and in tickling cough.

Mistura Acaciæ, D. L. *Mucilago*, E. ("Take of gum arabic, ℥iv.; water, ℥vj.; dissolve the gum in the water with occasional stirring, then strain through flannel," D. "Acacia, powdered, ℥x.; boiling distilled water, Oj.; rub the gum with the water gradually poured in until it is dissolved," L. "Gum arabic, ℥ix.; cold water, Oj.; mix, dissolve without heat, but with occasional stirring, and strain through linen or calico," E.) Mucilage made with cold water, as directed by the Dublin and Edinburgh Colleges, keeps best. The quantity of gum employed in the Dublin formula is too great. The following proportions of mucilage are required to render different substances miscible with aqueous vehicles, according to the observations of Dr. Montgomery in his notes on the Dublin Pharmacopœia of 1826: "*Oils* require about three-fourths of their weight, *balsams* and *spermaceti* equal parts, *resin*, two parts, and *musk* five times its weight."

Mistura Acaciæ, E. (Mucilage, f℥iij.; sweet almonds, ʒx.; pure sugar, ʒv.; water, Oij.; blanch the almonds, beat them to a smooth pulp in an earthenware or marble mortar, first with the sugar, and then with the mucilage; add the water gradually, stirring constantly; strain through linen or calico.) Used for the same purposes as almond mixture, (see page 229).

Trochisci Acaciæ, E. (Gum arabic, ℥iv.; starch, ℥j.; pure sugar, ℔j.; mix, and pulverise them; and make into a proper mass with rose-water for forming lozenges.) For cough, hoarseness, and irritation of the fauces.

INCOMPATIBLES.—Alcohol; ether; ammonia; acetate of lead; borax; and the mineral acids.

HEMIDESMUS INDICUS, D.—*The root of Hemidesmus indicus. Indian Sarsaparilla.* The root of this plant has, within the last twenty years, been employed in medicine in the British Isles, under the name of *Smilax aspera.* It is a native of the Indian peninsula; and belongs to the Natural family *Asclepiadaceæ.*

BOTANICAL CHARACTERS.—Roots, long, cylindrical; Stems, twining, woody, slender; Leaves, opposite, entire, glaucous, on short footstalks; Flowers, small, greenish-purple, in axillary racemes.

PHYSICAL AND CHEMICAL PROPERTIES.—As usually met with, the roots are from 10 to 12 inches in length, and vary in thickness from that of a goose-quill to that of the little finger. They consist of a reddish-brown corrugated epidermis, a yellow inner bark from a line to a line and a-half thick, and a paler coloured woody centre or meditullium; the bark splits transversely into rings, between which the meditullium is seen. Indian sarsaparilla has a very agreeable odour resembling that of the *Tonquin bean*, and a sweetish mucilaginous taste. It has not been accurately analysed, but Mr. Garden of London obtained from it a volatile crystallizable acid, which he has named *smilasperic (hemidesmic?* Pereira,) acid, and on which its fragrant odour depends. It imparts both odour and taste to cold and boiling water.

THERAPEUTICAL EFFECTS.—Although this root is highly esteemed in India as a diaphoretic and tonic, and is used there extensively as a substitute for sarsaparilla, it has been only employed in this country for preparing a demulcent syrup, which, chiefly in consequence of its agreeable flavour, is employed as a vehicle for more active medicines.

DOSE AND MODE OF ADMINISTRATION.—An infusion, prepared by infusing ℥ij. of the root in a pint of water, is employed in India. The dose of it is from f℥ij. to f℥iv.

Syrupus Hemidesmi, D. (Take of Indian sarsaparilla, bruised, ℥iv.; boiling distilled water, Oj.; refined sugar, in powder, as much as is sufficient: infuse the sarsaparilla in the water for four hours, in a covered vessel, and strain; set it by until the sediment subsides, then decant the clear liquor, and having added to it twice its weight of sugar, dissolve with the aid of a steam or water heat.) The syrup prepared with cold water is not only very much more fragrant but keeps better. Mr. Jacob Bell of London proposed the following method for preparing this syrup, which, in consequence of the excellence of the product obtained thereby, is inserted here at length:—"Root of hemidesmus indicus, ℥xvj.; refined sugar, ℔j.; distilled water, Oiij.; bruise the root sufficiently to separate the bark by sifting, and reject the wood; add to the bark an equal bulk of washed sand; moisten with water (three or four ounces), so as to insure its intimate mixture, and pack it well in a displacement apparatus; add as much water as it will absorb; macerate for four hours, and displace the liquor by the addition of a further portion of water; reserve the first six ounces; add more water till it passes through tasteless, then evaporate the latter portion to three ounces, in which, with the addition of the first six ounces, dissolve the sugar with as moderate a heat as possible." Dose, f℥j. to f℥ij.

HORDEUM, L. E. HORDEUM DISTICHUM, SEMINA DECORTICATA, D.—*Pearl-barley. The decorticated seeds of Hordeum distichum.* A native of Tartary, now cultivated extensively in Europe; belonging to the Natural family *Graminaceæ*, and to the Linnæan class and order *Triandria Digynia.*

BOTANICAL CHARACTERS.—Stems, 3 to 4 feet high, glaucous, furrowed; Leaves, alternate, lanceolate, acute; Flowers, terminal, in close spikes, with long serrated awns.

PREPARATION.—Pearl-barley is prepared in a mill of a peculiar construction, by which, after it has been deprived of its husk, it is rounded and polished.

PHYSICAL PROPERTIES.—Small spherical grains, white, smooth, still retaining a trace of the longitudinal furrow of the seed; they are odourless, but have a mild, sweetish, mucilaginous taste.

CHEMICAL PROPERTIES.—Pearl-barley is composed of fecula, uncrystallizable sugar, gum, gluten, albumen, lignin, &c. Proust has indicated the presence of a peculiar principle in barley-meal which he has named *hordeïn,* but Dr. Thomas Thomson states that it is merely a variety of *amylin.* According to Einhoff's analysis it consists of 60 per cent. of starch, 5·3 per cent. of sugar, 5 of albumen, and 1 of gluten. Pearl-barley yields its mucilaginous principles to boiling water; the decoction contains much starch, as shown by the action of iodine on it when cool.

THERAPEUTICAL EFFECTS.—Pearl-barley is employed in medicine in the form of decoction, as an emollient and demulcent drink in febrile and inflammatory affections, as a vehicle for other remedies, and to give bulk to enemata.

DOSE AND MODE OF ADMINISTRATION:—

Mucilago Hordei, D. (Take of ground pearl-barley, ℥ss.; water, f℥xvj. Triturate the barley with the water gradually added, then boil for a few minutes.)

Decoctum Hordei, D. L. ("Pearl-barley, ℥iss.; water, Oiss.; wash the barley in cold water, reject the washings, and then boil for twenty minutes in a covered vessel, and strain," D. "Pearl-barley, ℥iiss.; distilled water, Oivss.; first cleanse the barley by washing it with water, then boil for a short time with half a pint of the water poured on it, throw away this water and boil with the remainder of the water, previously heated, down to two pints," L.).

Decoctum Hordei compositum, L. (Decoction of barley, Oij.; figs, sliced, ℥iiss.; fresh liquorice root, bruised, ʒv.; raisins, stoned, ℥iiss.; distilled water, Oj.; boil down to Oij. and strain.)

Mistura Hordei, E. (Pearl-barley; figs, sliced; and raisins, stoned, of each, ℥iiss.; liquorice root, sliced and bruised, ʒv.; water, Ovss.; clean the barley if necessary, by washing it with cold water; boil it with Oivss. of the water down to Oij.; add the figs, raisins, and liquorice root with the rest of the water; boil down again to Oij.; then strain.)

Any of these preparations may be employed for the purposes above stated; the plain decoction or mucilage being used for injections, and the compound decoction or mixture for a soothing drink.

LINUM USITATISSIMUM SEMINA, D. LINI SEMEN, L. LINI SEMINA, E.—*Linseed. Seeds of Linum usitatissimum, the common Flax.*

LINI OLEUM, D. L. E.—*Linseed oil obtained from the seeds by expression.*

LINI FARINA, E.—*Linseed meal, deprived of fixed oil by expression.*

The common flax, *Linum usitatissimum*, is an indigenous plant; belonging to the Natural family *Linaceæ*, and to the Linnæan class and order *Pentandria Pentagynia*.

BOTANICAL CHARACTERS.—Stem a foot to a foot and a-half high, slender, branched above; Leaves, distant; Flowers, large, purplish-blue; Capsule, globular, ten-seeded.

PREPARATION.—The seeds are threshed out of the plant when fully ripe; and the oil is obtained from them by pressure without heat.

PHYSICAL PROPERTIES.—The seeds are ovate, pointed, about a line in length, smooth and shining; they are reddish-brown externally, whitish within; have an oily slightly sub-acrid taste, but are inodorous. The oil is thick, of a wine-yellow colour, with a faint disagreeable odour, and a sub-acrid, somewhat nauseous taste. Specific gravity, ·932. As met with in commerce, it is expressed with the aid of heat, when the colour is rather deeper. The seeds yield from 20 to 25 per cent. of oil.

CHEMICAL PROPERTIES.—The seeds consist of vegetable mucus containing free acetic acid and some salts, extractive, starch, wax, soft resin, gum, albumen, yellow colouring matter, and fixed oil, *(Meyer)*. The mucilage exists in the tegument, the fixed oil chiefly in the nucleus. Linseed oil is composed of *oleic* and *margaric* acids, combined in equal equivalents with *acroleine*, (SACC); it dissolves in 5 times its weight of boiling alcohol, in 40 times its weight of cold alcohol, and in about one part and a-half of ether. At a temperature of —17° it congeals into a solid yellow mass. Exposed to the air it concretes into a transparent varnish, and consequently is termed in the arts, *a drying oil.*

THERAPEUTICAL EFFECTS.—Linseed and its oil are emollient and demulcent. An infusion of the seeds is sometimes employed internally in dysentery and diarrhœa, and in bronchial affections ; it is also used as an emollient enema. Externally, the seeds reduced to powder, *linseed-meal,* are employed to prepare poultices and cataplasms ; for this purpose the meal should be *boiled* for a short time with the water and not simply mixed with it as is usually done and as is directed in the London Pharmacopœia ; this will prevent the poultice from adhering to the skin, besides rendering it a much more emollient application. A linseed meal cataplasm should be applied directly to the surface without the intervention of a fold of linen or muslin. Linseed-oil mixed with lime-water is used as an application to recent burns.

DOSE AND MODE OF ADMINISTRATION.—The following are the officinal preparations :—

Decoctum Lini compositum, D. *Infusum Lini compositum,* L. *Infusum Lini,* E. ("Linseed, ℥j. ; liquorice root, bruised, ʒss. ; water, Oiss. ; boil for ten minutes in a covered vessel, and strain while hot," D. "Linseed, ʒvj. ; fresh liquorice root, sliced, ʒij. ; boiling distilled water, Oj. ; macerate for four hours in a covered vessel and strain," L. " Linseed, ʒvj. ; liquorice root, bruised, ʒij. ; boiling water, Oj. ; digest for four hours near the fire, in a covered vessel, and then strain through linen or calico," E.). *Linseed Tea,* the best form for internal use, it may be sweetened with honey, which increases its emollient properties ; Dose, f℥ij. to f℥iv.

Linimentum Calcis, E. (Agitate briskly together equal parts of lime-water and linseed oil.) Olive oil has been substituted for linseed oil in the preparation of this liniment by the Dublin and London Colleges in their last Pharmacopœias. (See page 248.) This, commonly known by the name of *Carron oil,* is an excellent application to recent scalds and burns.

Cataplasma Lini, L. (Boiling water, f℥x. ; linseed meal, ℥ivss. or a sufficiency ; add the linseed to the water, constantly stirring, so as to form a cataplasm.)

INCOMPATIBLES.—Preparations of lead and iron, and probably most metallic salts are incompatible with infusion of linseed.

MALVA, E.—*Herb of Malva sylvestris. Common Mallow.* Indigenous ; belonging to the Natural family *Malvaceæ,* and to the Linnæan class and order *Monadelphia Polyandria.*

BOTANICAL CHARACTERS.—Root, perennial, tapering ; Stem, two to five feet high, branched ; Leaves on long petioles, five to seven lobed ; Flowers, large, three or four together, axillary, of a purplish-rose colour.

PREPARATION.—The herb should be gathered when in full flower.

PROPERTIES.—The entire plant is employed; it is odourless and insipid; every part of it abounds in mucilage, which it yields to boiling water. An infusion of the fresh flowers is an excellent chemical test for acids and alkalies, being changed to red by the former, and to green by the latter.

THERAPEUTICAL EFFECTS.—A simple emollient: it is employed in the same cases as the other remedies of this class, but at present is not much used, and consequently has been omitted from the last edition of the London Pharmacopœia.

MARANTA, D. L. E.—*Fecula of the tubers of Maranta arundinacea*, D. L. E., *and of Maranta indica*, D. E. *Arrow-root. Maranta arundinacea* is a native of the West Indies, it is extensively cultivated in Jamaica; *Maranta indica* is a native of the East Indies, and has been introduced into the Dublin and Edinburgh Pharmacopœias, as it is supposed to yield some of the East Indian arrow-root. They belong to the Natural family *Marantaceæ,* and to the Linnæan class and order *Monandria Monogynia.*

BOTANICAL CHARACTERS.—The rhizome is white, tuberous, and jointed, running horizontally in the ground, sending down many tuberous rootlets (*stoles*), about the thickness of a quill, covered with scales; Stem, 2 to 3 feet high; Leaves, ovate, lanceolate, alternate, with long, leafy, hairy sheaths; Flowers, small, white.

PREPARATION.—Arrow-root is the fecula of the *stoles;* it is procured from them when they are twelve months old; they are then dug up, cleansed, and reduced to a state of pulp in wooden mortars; the pulp is agitated with water, the fibres removed with the hand, the milky liquor passed through a fine hair-sieve, and allowed to settle, when it deposits the arrow-root, which is again washed with cold water, and finally dried in the sun.

PHYSICAL PROPERTIES.—*West Indian Arrow-root,* which is the most prized, is in the form of a very white powder, often aggregated into small irregular masses, crackling between the fingers, inodorous and tasteless. Examined by the microscope it is seen, like the other varieties of fecula, to consist of small elliptical grains, varying in size from a 2000th to a 750th of an inch in their longest diameter.

CHEMICAL PROPERTIES.—Its composition is $C^6H^5O^5$. In all other respects it resembles wheaten starch already described, but the jelly which it forms with boiling water is much more consistent; according to the observations of Hayne, with equal quantities of boiling water, the jelly formed by 9 parts of arrow-root is as firm as that formed by 14 parts of wheaten starch.

ADULTERATIONS.—A great many varieties of fecula, known in commerce as Brazilian arrow-root, East Indian arrow-root, &c., but especially that obtained from the potato, *potato-starch,* are commonly sold for the true West Indian arrow-root. The fraud is best detected by the microscope; the grains of which the true arrow-root is composed being much more minute than those of any of the other varieties.

THERAPEUTICAL EFFECTS.—Arrow-root is rather an article of mild nutritious diet for the invalid than a medicine, being particularly valuable in consequence of its emollient properties in diseases of the digestive organs; it is also an excellent nutriment for infants and young children.

DOSE AND MODE OF ADMINISTRATION.—A table-spoonful is sufficient to form a stiff jelly with a pint of boiling water or milk; to prepare it for use, the arrow-root should be first blended with a small quantity of the fluid, the remainder then added, care being taken that it is boiling, and the whole then gently heated for a few minutes; it is usually flavoured with lemon-peel, sugar, &c. Arrow-root milk and arrow-root pudding are made like the corresponding preparations of sago, (see page 251).

OLIVÆ OLEUM.—*Olive oil* (described in the division *Cathartics*,) acts also as an emollient; internally it is only employed as such in cases of irritant poisoning; as an external agent it enters into the composition of emollient ointments, liniments, &c.

Unguentum simplex, E. (Olive oil, f℥vss.; white wax, ℥ij.; melt the wax in the oil, and stir the mixture briskly while it concretes in cooling) A mild dressing.

Linimentum Calcis, D. L. ("Lime water; and olive oil; of each, f℥ij.; mix and agitate them well together," D. "Lime water and olive oil, of each f℥x.; agitate together until they are mixed," L.) See page 246.

OVI ALBUMEN ET VITELLUS, L. OVUM, E.—*The white and yolk of the egg of Gallus bankiva* var. *domesticus*, L. *The egg of Phasianus gallus.* E. *Phasianus gallus, the domestic fowl*, (Gallus domesticus *Temminck*), belongs to the class *Aves*, order *Gallinæ*. Eggs are a mild and nutritious article of diet, and as such are frequently used in the sick-room. The white, or *albumen*, is employed as an antidote in poisoning with corrosive sublimate, or with the salts of copper; it is also useful in all cases of irritant poisoning. The yolk is employed in pharmacy for suspending camphor, oils, resins, etc., in aqueous vehicles.

SACCHARUM COMMUNE E. SACCHARUM OFFICINARUM, D.—*Brown sugar*, D. *Raw sugar. Muscovado.*

SACCHARUM PURIFICATUM, D. SACCHARUM, L. SACCHARUM PURUM, E.—*Prepared juice from the stem of Saccharum officinarum, purified and crystallized*, L. *Pure sugar. White or refined sugar.*

THERIACA, D. SACCHARI FÆX, L. E.—*Molasses; Treacle; or the concentrated uncrystallized juice of Saccharum officinarum,* D. *The unpurified prepared juice of Saccharum officinarum,* L. The sugar cane, *Saccharum officinarum,* is extensively cultivated in both the East and West Indies; it belongs to the Natural family *Graminaceæ,* and to the Linnæan class and order *Triandria Digynia.*

BOTANICAL CHARACTERS.—Stem, solid, juicy, from 6 to 12 feet high, coloured; Leaves, flat, in two rows, sheathing at the base; Flowers, triandrous, in a terminal panicle from 2 to 4 feet long, of a silver-grey colour from the long soft hairs that surround the flower.

PREPARATION.—The canes, when ripe, are cut off close to the ground, and the juice expressed from them by pressure between rollers; milk of lime is immediately added to the liquor, and the mixture gently heated, to saturate any acid present and to remove the herbaceous matter. The clear liquor is then drawn off, evaporated to a proper consistence in copper boilers, and allowed to cool in large wooden vessels, in which the impure sugar is deposited in coarse brown grains; this constitutes *raw sugar or muscovado.* The syrupy liquor, which does not crystallize, constitutes *molasses or treacle.* Raw sugar is refined in England: it is first dissolved in a small quantity of water by the aid of steam, heated for a short time with bullocks' blood, or with hydrate of alumina, which clarifies the syrup, then strained to remove the impurities, and filtered through a thick layer of animal charcoal; the clear liquor is next evaporated by steam heat in copper vessels placed in a partial vacuum, to a proper consistence, and poured into conical moulds; as soon as it becomes solid in the moulds, they are put to drain, and a solution of pure syrup, or a mixture of clay and water, poured over the base of each loaf; which, as it gradually percolates through the sugar, removes any impurities. These loaves constitute *loaf-sugar*, *refined sugar*, *or pure sugar.*

PHYSICAL PROPERTIES.—The physical properties of the different varieties of sugar are too well known to need description. The specific gravity of crystallized white sugar is 1·6.

CHEMICAL PROPERTIES.—Sugar is permanent in the air, exposed to heat it melts, becomes brown, and emits a peculiar odour; it is inflammable, burning with a white flame; is soluble in two parts of water at 60°, and to any extent in boiling water; is also soluble in 80 parts of absolute alcohol at the boiling temperature, very slightly in the same when cold, and in about five parts of rectified spirit; much more soluble in proof spirit; but wholly insoluble in ether, which precipitates it from its solutions. In the crystalline state, cane sugar is composed of $C^{12} H^9 O^9 + 2HO$. Treacle consists principally of uncrystallizable sugar, gummy extractive, and a small quantity of water, which it retains with so great tenacity, that if left exposed to the air, even for a very long period, it does not become drier, or lose weight.

ADULTERATIONS.—The inferior raw sugars frequently contain sand which is left when the sugar is dissolved in water; white sugar is said to be adulterated with lime and gum; the former is detected by oxalic acid, the latter by diacetate of lead, producing white precipitates in a solution. Raw cane sugar is in the present day commonly adulterated with grape sugar, a fraud of much importance in consequence of the inferior sweetening powers of the latter. That variety of it obtained from potatoes—*potato sugar*—is generally used for this purpose. It may be detected by the following simple and beautiful test of Trommer :—" Dissolve the specimen in water, add sufficient solution of sulphate of copper to colour the liquid blue, then a large excess of solution of caustic potash ; the blue precipitate at first thrown down is re-dissolved with an intense purplish-blue colour by the excess of alkali. On heating the liquid now to the boiling point, if there is no grape sugar present, it undergoes but little change ; but if it contains any, a precipitate of brilliant red sub-oxide of copper is thrown down, copious in proportion to the quantity of grape sugar present."

THERAPEUTICAL EFFECTS.—Sugar is highly nutritious, but as an article of diet is rather employed for its agreeable sweetness. As a medicine it is emollient and demulcent, and as such, is used in coughs, and in irritant poisoning. In pharmacy it is in very general use as a flavouring ingredient, and to give bulk and consistence to powders, pills, conserves, electuaries, lozenges, syrups, &c.

DOSE AND MODE OF ADMINISTRATION.—The following is the only officinal preparation of sugar :—

Syrupus, L. *Syrupus simplex*, D. E. (" Take of refined sugar in powder, ℔v. ; distilled water, Oij. ; dissolve the sugar in the water, with the aid of a steam or water heat. The specific gravity of this syrup is 1330," D. " Sugar, ℔iij. ; distilled water, Oj. ; dissolve with a gentle heat," L. " Pure sugar, ℔x. ; water, Oiij. ; dissolve the sugar in the water with the aid of a gentle heat," E.). As a flavouring adjunct to mixtures, and to suspend insoluble substances in aqueous vehicles.

SACCHARUM LACTIS, D.—*Sugar of Milk. Lactine.*

PREPARATION.—An article of the Materia Medica introduced into the last edition of the Dublin Pharmacopæia. It is prepared by evaporating clarified whey to a syrupy state, and setting aside to cool, when the lactine crystallizes slowly. The crystals may be purified by means of animal charcoal.

PHYSICAL PROPERTIES.—It occurs in white, translucent, small square prisms, of great hardness. They feel gritty under the teeth, and have a faint sweetish taste, but a strong solution in water tastes much more sweet.

CHEMICAL PROPERTIES.—The composition of crystallized sugar of milk is $C^{12} H^{10} O^{10} + 2HO$. It dissolves very slowly in cold water, requiring five or six times its weight ; but is soluble in twice and a-half its weight of boiling water. It is insoluble in alcohol and ether. Heated, it loses water, turns black and is decomposed. Milk sugar may be converted into grape sugar by boiling it with the dilute mineral acids.

THERAPEUTICAL EFFECTS.—Sugar of milk is only used in medicine as an excipient for active substances or for heavy powders, such as calomel, &c., for which purpose it is admirably suited. It is employed by the Homœopathists as an excipient for their globules and powders almost exclusively.

SAGO, D. L. E.—*The farina from the interior of the trunk of Cycas circinalis; also obtained from other species of Cycas and various Palmaceæ,* D. *The fecula of the stem of Sagus lævis and probably of other species of palms,* L. *Farina from the interior of the trunk of various Palmaceæ and species of Cycas,* E. *Sago.* It has been ascertained that various species of the palm tribe yield the sago of commerce; the finest is procured from *Sagus farinifera,* and *Sagus genuina,* trees which form immense forests on nearly all the Moluccas, and which are so rich in starch that a single tree is reckoned to yield from 600 to 800 pounds weight of sago. Some is also obtained from the *Sagus rumphii,* a native of Malacca and the Malay islands, and from the *Saguerus rumphii* which inhabits the islands eastward to the Bay of Bengal; it is also procured from the *Cycas circinalis* and *revoluta,* from the *Areca oleracea,* the *Phœnix farinifera,* the *Arenga saccharifera,* &c. They are all lofty trees, belonging to the Natural family *Palmaceæ,* and to the Linnæan class and order *Monœcia Hexandria.*

PREPARATION.—The tree being cut down, the pith is removed, reduced to powder, and the fecula separated from the woody fibre by repeated washings with water over a hair sieve; when the milky liquor, which passes through, is allowed to settle, it deposits the sago in the form of fine powder, which is afterwards granulated by a process with which we are not acquainted.

PHYSICAL PROPERTIES.—Sago occurs in the form of a fine powder *(Sago meal),* or in pearly grains *(Pearl Sago);* both sorts have a pinkish-yellow tint, a faint musty odour, but no taste. The grains of pearl-sago vary in size from a pin's head to that of a pea; the small variety is most esteemed, the larger sort is known as *common* or *brown sago.*

CHEMICAL PROPERTIES.—In its chemical properties, sago resembles the other varieties of starch; but it does not form so firm a jelly with water as arrow-root: as seen under the microscope, its globules are larger than those of arrow-root, but smaller than those of potato-starch.

THERAPEUTICAL EFFECTS.—For the sick room, sago is much inferior to arrow-root or tapioca as an article of diet, consequently it is not much used in the present day. The jelly may be prepared with it in the same manner as with arrow-root.

Sago milk; THOMSON. (Sago, ℥j.; cold water, Oj.; soak the sago in the water for an hour, pour off the water, and add of new milk, Oiss; and boil slowly until it is well incorporated.) It may be flavoured with sugar, nutmeg, cinnamon, or white wine according to circumstances.

Sago pudding; THOMSON. (Beat the yolks of two eggs and half an ounce of sugar together, and stir the mixture into a pint of sago milk.)

SALEP.—*The dried root of Orchis mascula;* an indigenous plant belonging to the Natural family *Orchidaceæ,* and to the Linnæan class and order *Gynandria Monandria.*

By grinding the dried roots of this and of other species of the genera Orchis and Eulophia, a nutritious substance is procured, which, although highly esteemed by the ancients, and in modern times in the East, is but little employed in the present day amongst Europeans. It contains a large quantity of gum—insoluble in cold but soluble in boiling water *(bassorin),* and a trace of fecula. A mucilage formed by boiling ℥ss. of it in Oj. of water, forms a nutritious and useful article of diet for the sick. • In Turkey, where salep enjoys a high reputation as a corroborant in affections of the bowels and respiratory organs, the dried root is ground by means of handmills to a fine powder, then stirred up with water, and boiled into a stiff jelly which is sweetened with honey.

SAMBUCUS NIGRA, L. E.—The fresh flowers of the common elder, *Sambucus nigra,* are officinal in the London and Edinburgh Pharmacopœias. It is a small indigenous tree, belonging to the Natural family *Caprifoliaceæ,* and to the Linnæan class and order *Pentandria Digynia.* A distilled water, an oil, and an ointment are directed to be prepared from them, all of which possess an agreeable odour and mildly emollient properties.

Aqua Sambuci, L. E. *Elder-flower water.* ("Elder flowers, ℔x.; water, cong. ij.; distil a gallon," L. "Elder flowers, ℔x.; rectified spirit, f℥iij.; water, cong. ij.; mix, and distil a gallon," E.) A useful excipient for alkaline and other washes in diseases of the eye and of the skin.

Unguentum Sambuci, L. (Elder flowers; and lard, of each, ℔j.; boil the elder flowers in the lard until they become crisp, and press through a linen cloth.)

TAPIOCA, D. E.—*Fecula of the root of Janipha manihot (Manihot utilissima,* POHL). *Mandioc plant. Tapioca.* A native of Brazil; belonging to the Natural family *Euphorbiaceæ,* and to the Linnæan class and order *Monœcia Monadelphia.*

BOTANICAL CHARACTERS.—Root, large, thick, juicy; Stem about 6 feet high, shrubby; Leaves, palmate, 5–7 parted; Flowers, axillary, racemose.

PREPARATION.—The root, which consists of woody fibre, a bland fecula, and a highly acrid, poisonous, milky juice, is reduced to a pulpy mass, washed and pressed on mat-sieves; the milky liquor, with the fecula suspended in it, passes through, and on settling deposits the fecula, which is repeatedly washed with water to free it from the poisonous juice, and finally dried on hot plates; the marc is afterwards dried on iron plates over a fire, when it constitutes *Cassava* bread.

PHYSICAL PROPERTIES.—Tapioca occurs in irregularly shaped, rugged fragments about the size of a small nut; white with a pinkish hue, inodorous and tasteless. Like the other feculas, as seen under the microscope, it consists of small globules very uniform in size, and nearly as small as the smallest globules of arrow-root.

CHEMICAL PROPERTIES.—It is similar to the other varieties of fecula, and is a very fine form of starch.

THERAPEUTICAL EFFECTS.—Precisely similar to those of arrow-root; a jelly may be prepared in the same manner. Tapioca milk and tapioca pudding are made in the same way as sago milk and sago pudding.

TRAGACANTHA, D. L. E.—*Gummy exudation from Astragalus gummifer*, D. *Gummy exudation hardened in the air from the bark of Astragalus verus*, L., *and from other species*, E. Several species of the genus Astragalus yield gum-tragacanth; they are natives of Asia Minor, of Persia, and of the island of Crete. They are placed in the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and in the Linnæan class and order *Diadelphia Decandria*. The officinal tree of the Dublin College yields an inferior quality of gum, described by Guibourt as pseudo gum-tragacanth.

BOTANICAL CHARACTERS.—The Astragalus verus, which yields the finest gum-tragacanth of English commerce, is a small shrub, from 3 to 4 feet high, with spiny branches, pinnatifid leaves, and yellow papilionaceous flowers.

PREPARATION.—Tragacanth flows from natural fissures in the bark, and concretes rapidly when exposed to the air; it flows only during the hot season and in the night time.

PHYSICAL PROPERTIES.—Gum-tragacanth occurs in broad, thin plates of a white or citron-yellow colour, semi-transparent, marked with concentric elevations, as if it had been exposed to the waves of the sea. It is inodorous and tasteless, is hard and brittle, but with difficulty reduced to powder, unless heated to 100° or 120° F.

CHEMICAL PROPERTIES.—It is composed of 57 per cent. of soluble gum *(adragantine or arabin)*, and 43 per cent. of gum insoluble in cold but soluble in boiling water *(bassorin)*, (Bucholz). Gum-tragacanth forms a thicker mucilage with water than gum arabic, "one part giving more viscosity to water than 25 parts of gum arabic," (Bucholz).

THERAPEUTICAL EFFECTS.—Similar to those of gum arabic, but not so generally employed.

DOSE AND MODE OF ADMINISTRATION —Powder, ʒss. to ʒij.

Pulvis Tragacanthæ compositus, L. E. (Tragacanth, bruised; gum arabic, bruised; and starch, of each, ℥iss.; pure sugar, ℥iij; reduce the starch and sugar together to powder, add the tragacanth and gum arabic, and pulverise the mixture thoroughly.) Generally used for administering calomel and other active and heavy powders to children. The dose as an emollient for adults is from ʒj. to ʒij.

Mucilago Gummi Tragacanthæ, E. (Tragacanth, powdered, ʒij.;

boiling water, f℥ix. ; macerate for 24 hours, triturate to dissolve the gum, and strain.) Used for the same purposes as mucilage of gum arabic.

UVÆ PASSÆ, D. E. UVA, L.—*The dried fruit of Vitis vinifera. Raisins.*

VITIS VINIFERA, FRUCTUS RECENS, D. *Grapes.* The grape-vine is generally cultivated throughout the greater part of the globe; it belongs to the Natural family *Vitaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—A hardy climbing shrub; Leaves, alternate, smooth, lobed; Flowers, very small, greenish, in pendant racemes opposite to the leaves; Fruit, a succulent globose berry, usually four-seeded.

PREPARATION.—To prepare raisins, grapes are in general merely dried in the sun, sometimes artificial heat is employed; and in many places the fruit is dipped in an alkaline ley before being dried.

PHYSICAL PROPERTIES.—Raisins are too well known to require description; two sorts widely different in appearance and flavour are commonly met with; the common raisin *(Passulæ Majores)*, which alone is officinal; and dried currants *(Passulæ Minores)*, which are the product of a small variety of vine, an inhabitant of Greece especially the neighbourhood of Corinth, and of the islands of Zante and Cephalonia. Grapes and raisins are imported into the British islands chiefly from Spain, Portugal, and the Levant; Muscatel raisins are the finest.

CHEMICAL PROPERTIES.—Raisins consist of uncrystallizable sugar *(grape sugar)*, mucilage, extractive, bitartrate of potash, malic and citric acids, &c.

THERAPEUTICAL EFFECTS.—Raisins are emollient, nutritive, and demulcent; they are only employed in medicine as flavouring adjuncts, for which purpose they form ingredients in many officinal preparations. Grapes are an agreeable cooling fruit for the sick room.

CHAPTER XII.

EPISPASTICS.

(Vesicants ; Rubefacients ; Counter-irritants ; Derivatives ; Revulsives.)

EPISPASTICS are substances which produce irritation, inflammation, or vesication, when applied to the skin. They are employed in the practice of medicine principally with the intention of relieving or removing the diseased condition of some internal organ, by producing a determination of blood to the surface immediately over the seat of the affection or to some remote part. Independently of this effect, however, blisters, which are the most important therapeutical agent in this division, act also as general stimulants to the system, and, as such, are frequently used with much benefit in the advanced stages of typhoid fevers, and in spasmodic affections arising from debility. This stimulant action of blisters is to be borne in mind, and consequently their application should be avoided in the very acute stages of inflammatory diseases until the general excitement has been previously subdued by antiphlogistic means. Another effect produced by blisters, and with which intention they are not unfrequently employed, is to cause an immediate discharge of serum from the vascular system ; this is often attended with the most beneficial results in cases of sudden effusion into the pericardium, the pleura, or the substance of the lungs. When used with this intention the blister should be of large size, and left in contact with the skin sufficiently long to produce free vesication. Blistering agents are also applied to the surface of the body for the purpose of removing the epidermis, so as to permit the direct application of various medicinal substances to the absorbing layer of the true skin : mercury is thus very frequently introduced into the system ; and strychnia, morphia, &c., are sprinkled over the denuded part in certain diseases, with the intention of producing a direct local action. Epispastics are generally applied as near the seat of the disease as possible, unless when the intention is to produce a determination to some remote part of the body, as in the application of sinapisms to the feet or calves of the legs in affections of the head. In the employment of any of the remedies contained in this class, in the diseases of infancy and childhood, it must be remembered that inflammation of the skin is much more readily produced in the young than in persons advanced in life, and consequently their effects must be carefully watched: this is more especially the case with reference to blisters (see page 259).

AMMONIÆ LIQUOR FORTIOR, D. L. AMMONIÆ AQUA FORTIOR, E. —*Stronger solution of ammonia.* (These preparations have been described in the chapters which treat of *Antacids* and *Caustics*). Applied to the surface of the body, the stronger solution of ammonia produces redness and irritation, and, if the application be long enough continued, vesicates. Its only advantage as a blistering agent is that it operates speedily, on which account it is employed in inflammation suddenly attacking any of the abdominal viscera, as in retrocedent gout. In diseases of the urinary organs it should be preferred as a blistering agent to cantharides, in consequence of the irritant action of that substance on the kidneys. As a counter-irritant it is frequently used to relieve internal inflammations; and as a rubefacient, it is employed in muscular and neuralgic pains. An immediate blister may be readily produced by pouring eight or ten drops of concentrated solution of ammonia on a piece of lint, and applying it to the skin with moderate pressure.

Linimentum Ammoniæ, D. L. E. ("Solution of ammonia, f℥j.; olive oil, f℥iij.; mix them with agitation," D. "Solution of ammonia, f℥j.; olive oil, f℥ij.; shake them together until they are mixed," L. "Solution of ammonia, density 960, f℥j.; olive oil, f℥ij; mix, and agitate well together," E.). This preparation, so generally known as a domestic remedy by the name of *hartshorn and oil,* is an excellent counter-irritant much employed in inflammatory sore throat; it is usually applied on a piece of flannel. By increasing the quantity of ammonia it produces more powerful effects.

Linimentum Camphoræ compositum D. L. *Linimentum Ammoniæ compositum,* E. ("Camphor, ℥v.; oil of lavender, fʒij.; rectified spirit, Oiss.; stronger solution of ammonia, Oss.; dissolve the camphor and oil of lavender in the spirit, then add the solution of ammonia and mix with agitation," D. "Camphor, ℥iiss.; oil of lavender, fʒj.; rectified spirit, f℥xvij.; stronger solution of ammonia, f℥iij.; dissolve the camphor and oil in the spirit, then add the ammonia, and shake them together until they are mixed," L. "Stronger aqua ammonia (Dens. ·880), f℥v.; tincture of camphor, f℥ij.; spirit of rosemary, f℥j.; mix well together; this liniment may be also made weaker for some purposes with f℥iij. of tincture of camphor and f℥ij. of spirit of rosemary," E.). Compound camphor liniment is the most useful counter-irritant in the Pharmacopœia, where it is wished to produce an immediate and decided effect, as in inflammation suddenly attacking some internal organ. When poured on a fold of linen and applied immediately to the skin, being kept closely in contact with the surface by pressure, it may be made to vesicate if left on sufficiently long, an effect, however, rarely required from it. It should in nearly every case be preferred to a cantharides blister in affections of infants and young children. These preparations are also used for the same purposes as the liniment of ammonia, than which they are cleaner, more agreeable, and more efficacious. As kept in the shops, compound camphor liniment is usually too weak to produce a sufficiently active counter-irritant effect, and therefore in prescribing it, the addition of fʒj. of the stronger solution of ammonia to each fluid ounce is always advisable, when an immediate powerful action is desired.

Linimentum Ammoniæ sesquicarbonatis, L. (Solution of sesquicarbonate of ammonia, f℥j. ; olive oil, f℥iij. ; shake together until they are mixed.) Its effects and uses are similar to those of *Linimentum Ammoniæ.*

Ammoniacal blistering ointment, GONDRET. (Take of axunge, ℥j.; oil of sweet almonds, f℥ss.; melt together with a gentle heat ; pour the mixture while still liquid into a wide-mouthed glass vessel; then add, water of caustic ammonia, f℥v., and mix with constant agitation till cold.) In preparing this ointment particular care must be taken that the axunge be merely melted ; if it be too fluid or too warm, some of the ammonia will be vaporised and the resulting ointment weak. It may be kept unchanged for many months, in stoppered glass bottles in a cool place. It is applied by spreading it over the skin, and covering the part with a compress. It vesicates in about ten minutes.

ANTIMONII ET POTASSÆ TARTRAS.—*Tartar emetic* (described in the division *Diaphoretics*), applied by friction to the skin, produces a crop of pustules which ulcerate and discharge purulent matter, causing thereby a counter-irritant action. With this intention it is very frequently employed in various affections of the thoracic and abdominal viscera ; in subacute inflammations of the brain or spinal cord and their membranes; in diseases of the joints ; in muscular and neuralgic pains, &c. It is usually applied in the form of ointment or saturated solution ; or from gr. v. to gr. x. may be sprinkled over the surface of any simple plaster, and left on until the desired effect is produced. The concentrated solution is applied by means of pledgets of linen soaked in it; its operation is more speedy than that of the ointment. Rollott has proposed a new method for producing counter-irritation with tartar emetic. He places a small quantity in very fine powder on a piece of glass, and makes it into a thick paste with a drop or two of oil or water. This he inserts with a lancet under the skin, in the same manner as vaccine matter, proportioning the number of punctures to the effect it is wished to produce.

Unguentum Antimonii Tartarizati, D. *Unguentum Antimonii Potassio-tartratis*, L. *Unguentum Antimoniale*, E. ("Tartar emetic, in very fine powder, ʒj. ; ointment of white wax, ʒvij. ; triturate the powder with the ointment in a mortar until they are intimately mixed," D. "Tartar emetic, in very fine powder, ℥j. ; lard, ℥iv. ; rub together," L. E.) The Dublin preparation is too weak, and therefore often fails to produce any effect. This ointment is applied by rubbing about half a drachm on the skin night and morning ; in two or three days pustules begin to appear, when the application of the ointment should be discontinued, as it sometimes gives rise to troublesome ulceration.

AQUA FERVENS. Boiling water has been used to produce rapid and extensive vesication, as a means of rousing the system in narcotic poisoning; the difficulty of confining its action, the great pain caused, and the troublesome ulceration which may be occasioned, forbid its use except in extreme cases.

CANTHARIDES (described in the division *Diuretics*), are employed externally to produce rubefaction, vesication, or suppuration. The first of these effects is caused by the application of cantharides mixed with other substances to blunt their activity, as in the *Emplastrum calefaciens* of the Dublin Pharmacopœia, or by applying the active preparations for a short space of time only. To produce rubefaction cantharides are employed in the treatment of rheumatic and other local pains, in chronic catarrh, and in the habitual cough of the old and debilitated. When cantharides are left for some time closely applied to the surface of the skin, the cuticle is raised and serous fluid effused between it and the true skin, a blister being thus produced in a period varying with the preparation of the flies which is employed. No other agents are so generally used to produce vesication as cantharides, in consequence of the certainty of their operation, the comparatively little pain which they occasion, and the facility with which they may be applied. Blisters are employed in a great variety of diseases, generally with the intention of relieving pain, inflammation, and congestion of internal organs, which they effect by derivation to the surface of the body, or as it is usually termed by counter-irritation. With this view they are applied in both the acute and chronic forms of inflammation of the brain and spinal cord, to the scalp or along the track of the spinal marrow ; in inflammatory affections of the thoracic and abdominal viscera, to the surface of the chest or abdomen ; and in the local congestions of fevers, as near the affected part as possible. Blisters are also used to stimulate to increased action, as in indolent buboes, in chronic enlargement of the testicle, over cold abscesses, to indolent ulcers, and in effusion into the joints. To excite the system generally, they are applied in the comatose stages of typhoid fever or pestilential cholera, and in apoplectic affections. To produce suppuration, cantharides are used in the form of ointment, as a dressing to parts from which the cuticle had been previously removed; and, as powerful counter-irritants, forming what is termed a perpetual blister, are thus employed with much advantage in chronic inflammatory diseases. Cantharides should not be applied to produce vesication when any irritation or inflammation of the urinary organs is present, in consequence of their peculiar tendency to cause strangury. In infants and young children, blisters should be used with great caution, as they are liable to produce troublesome sloughing, which in many instances has caused death. As a general rule they should be left on only until redness of the surface is produced, when the application of a warm poultice to the part will cause vesication.

PHARMACEUTICAL PREPARATIONS:—

Emplastrum Cantharidis, D. L. E. (" Spanish flies, in very fine powder, ℥vj.; yellow wax; resin; prepared lard, of each, ℥iv.; to the wax, resin and lard, previously melted together by a steam or water heat, add the Spanish flies, and stir the mixture constantly until the plaster is cool," D. " Cantharides reduced to very fine powder, lbj.; wax; suet, of each, ℥viiss.; resin, ℥iij.; lard, ℥vj.; add the resin, previously melted, to the wax, suet and lard melted together; then remove from the fire, and a little before they concrete sprinkle in the cantharides and mix," L. " Cantharides, in very fine powder; wax; resin; and suet, of each, ℥ij.; liquefy the fats, remove from the heat, sprinkle in the cantharides, and stir briskly as the mixture concretes on cooling," E.). This is the preparation most generally employed to produce a blister; it is spread on leather with a cold (*not heated*) spatula, and the margin covered with adhesive plaster to prevent its moving or falling off; blistering plaster, however, acts much better when spread on soft brown paper in a thin layer, in consequence of its being much more easily and more perfectly kept in close contact with the skin, which is effected by means of a bandage. In ordering blisters in prescriptions, it is usual to draw an outline with the pen of the size and shape which it is wished that they should be; but in some of the continental pharmacopœias, as in that of Hamburgh, prescribed sizes are given for them. In order to prevent the irritant action of cantharides on the urinary organs, in persons liable to such an effect, a piece of tissue paper oiled should be placed between the plaster and the skin. Blisters are usually left on from eight to twelve hours to produce their action; the raised cuticle should be then cut to allow the escape of the serum,—except in children and young persons, or those with a very irritable skin, when the vesications should not be broken,—and a dressing of spermaceti or some simple ointment applied. Unless when it is wished to produce a copious serous discharge, however, the following method, which I have adopted for years, and which was first proposed by Dr. Douglas Maclagan of Edinburgh, will be found far preferable: the blister is left on for five or six hours according to circumstances, a poultice then applied for two hours, and the raised cuticle having been removed with a pair of scissors, the surface is covered with a thick layer of raw cotton; it heals completely in about twenty-four hours, but is so little painful after twelve hours, that percussion and auscultation may be performed on the part—of course without disturbing the cotton—a matter of much importance in pulmonary affections.

Emplastrum Calefaciens, D (Plaster of Spanish flies, lbss.; Burgundy pitch, lbvss.; melt them together by means of a steam or water-bath, and withdrawing the heat stir constantly until the mixture stiffens.) Rubefacient; its uses have been described above. (See page 258.)

Acetum Cantharidis, D. L. E. ("Spanish flies, in fine powder, ℥iv.; strong acetic acid, f℥iv.; acetic acid of commerce, (specific gravity, 1044), f℥xvj.; mix the acids, and having added the flies macerate in a close vessel for 14 days; then strain through flannel with expression, and filter so as to obtain a clear liquor," D. "Cantharides, in very fine powder, ℥ij.; acetic acid, Oj.; macerate for 8 days, frequently shaking; express, and strain," L. "Cantharides, in powder, ℥iij.; acetic acid, f℥v.; pyroligneous acid (dens. 1034), f℥xvj. ; euphorbium, in coarse powder, ℥ss. ; mix the acids, add the powders, macerate for 7 days, strain and express strongly, and filter the liquor," E.). Employed as an extemporaneous blister ; it may be conveniently applied with a piece of sponge, and produces a blister in from 5 to 10 minutes. Complaints are frequently made of the inefficiency of this preparation, which arises either from its being prepared with weak acid, or from its not being rubbed into the skin with sufficient care, as the application should be continued until it produces intense redness of the part and much pain.

Linimentum Cantharidis, D. (Spanish flies, in fine powder, ℥iij. ; olive oil, f℥xij.; digest the flies in the oil for three hours in a steam or water-bath, and strain through flannel ; express the residuum and strain the oil thus obtained ; finally mix both products.) A rubefacient liniment not used in consequence of its disagreeable odour : it is employed in the preparation of the ointment of Spanish flies. I have applied it occasionally with good effect as an addition to ointments when it is desired to stimulate the scalp in cases of alopœcia.

Ceratum Cantharidis, L. *Unguentum Cantharidis*, E. ("Cantharides, in very fine powder, ℥j. ; spermaceti cerate, ℥vj. ; add the cantharides to the cerate softened by heat, and mix," L. "Resinous ointment, ℥vij. ; cantharides, in fine powder, ℥j. ; melt the ointment ; sprinkle into it the cantharides powder, and stir the mixture briskly as it concretes in cooling," E.) Used to promote suppuration from blistered surfaces, but it is very apt to cause strangury.

Unguentum Cantharidis, D. L. *Unguentum Infusi Cantharidis*, E. ("Liniment of Spanish flies, f℥viij. ; white wax, ℥iij. ; spermaceti, ℥j. ; melt the wax and spermaceti in the oil with a gentle heat, and stir the mixture constantly until it concretes, D. "Cantharides, in very fine powder, ℥iij. ; distilled water, f℥xij. ; cerate of resin, ℔j. ; boil down the water with the cantharides to half, and strain ; mix the cerate with the strained liquor, then evaporate to a proper consistence," L. "Cantharides, in moderately fine powder ; resin ; and wax, of each, ℥j. ; Venice turpentine ; and axunge, of each, ℥ij. ; boiling water, f℥v. ; infuse the cantharides in the water for a night, squeeze strongly, filter the liquid, add the axunge, and boil till the water is dispersed ; add the wax and resin ; and when these have melted, remove the vessel from the fire, add the turpentine, and mix the whole thoroughly," E.) Used for the same purposes as the cerate, than which these preparations are somewhat milder.

Emplastrum Cantharidis compositum, E. (Venice turpentine, ℥ivss. ; Burgundy pitch ; and cantharides, of each, ℥iij. ; wax, ℥j. ; verdigris, ℥ss. ; white mustard seed ; and black pepper, of each, ℥ij. ; melt the wax and Burgundy pitch, add the turpentine, and while the mixture is hot sprinkle into it the remaining articles previously in fine powder and mixed together ; stir the whole briskly as it concretes in cooling.) A more certain blister than the simple *emplastrum cantharidis ;* according to Duncan it is *infallible.*

Blistering cloth, PARIS CODEX. (Oil of cantharides obtained by ether, 4 parts ; yellow wax, 8 parts ; melt with a very gentle heat, and spread on waxed linen or calico.) A more elegant preparation than blistering plaster, and equally, if not more, efficacious.—*Tela vesicatoria ; Charta vesicatoria*, &c. ; so generally employed in the present day for blistering, are prepared in the same manner, paper being used instead of calico.

Papier d'Albespeyres, now so commonly employed for keeping up a discharge from blistered surfaces, is prepared as follows :—No. 1., which is the weakest ; "White wax, 5 parts ; olive oil, 3 parts ; oil of chocolate, 4 parts ; spermaceti, 3 parts ; turpentine, 1 part ; cantharides, 1 part ; water, 8 parts ; all melted together."—No. 2. "White wax, $3\frac{3}{4}$; olive oil, $2\frac{1}{4}$; oil of chocolate, 3 ; spermaceti, $2\frac{1}{4}$; turpentine, $\frac{3}{4}$; cantharides, 1 ; water, 8."—No. 3, the strongest, contains the same quantities of cantharides and water, and half the proportions of the other ingredients contained in No. 1. The compound is spread on paper, on fine linen, or on calico.

Æther Cantharidalis, ŒTTINGER. (Cantharides, in coarse powder, 1 part ; sulphuric ether, 2 parts ; digest for three days and express.) This preparation is an active vesicant ; mixed with equal parts of hog's-lard it forms an admirable preparation for blistering children, vesicating after two or three applications within two hours.

Collodium Vesicans seu Cantharidale. (Most readily prepared by mixing together equal parts of collodium and cantharidal ether). An elegant preparation, possessing the advantage that its strength can be easily increased or diminished. It is now much used for blistering, owing to its cleanliness, its certainty and the facility with which it may be applied in the neighbourhood of joints or to other parts of the body which it is difficult to blister by the ordinary method. It is applied with a camel's-hair-brush: two scruples are sufficient to blister a surface the size of the palm of the hand; it is preferable to apply the quantity to be used twice, instead of at one time, on the place to be blistered.

CAPSICUM ANNUUM, D. CAPSICUM, L. E.—*The fruit of Capsicum annuum,* D., *and of other species of Capsicum,* E.—*of Capsicum fastigiatum,* L. *Capsicum, or Chillies. Cayenne pepper.* The Capsicum annuum (Capsicum fastigiatum, *Blum*) is a native of the East and West Indies, of the East coast of Africa, and of South America; it belongs to the Natural family *Solanaceæ,* and to the Linnæan class and order *Pentandria Monogynia.* The fruit of the variety grown in Guinea is directed to be employed by the London College.

BOTANICAL CHARACTERS.—A herbaceous annual, 1–2 feet high; Leaves, ovate, smooth, placed on long footstalks in irregular order; Flowers, white, axillary, solitary; Fruit, a long conical, juiceless, scarlet or yellow berry, pendulous.

PREPARATION.—Cayenne pepper is prepared by reducing to a moderately fine powder the dried fruit of this and of other species. The characters of the fruit directed to be employed by the London College are as follows: "Less than an inch in length, oblongo-cylindrical, straight." It is often imported in powder, in small gourds, chiefly from the West Indies; but the greater part is ground at home, a fourth part of common salt being generally mixed with it.

PHYSICAL PROPERTIES.—A moderately fine powder, of a reddish-yellow colour; with a faint aromatic odour, and a bitter, acrid, burning taste.

CHEMICAL PROPERTIES.—The active properties of Cayenne pepper depend on a very acrid solid oil which has been named *Capsicin,* and which when quite pure may be crystallized. It yields its virtues to water, alcohol, ether, acetic acid, and the fixed and volatile oils.

THERAPEUTICAL EFFECTS.—Cayenne pepper applied to the skin produces redness and inflammation, which are followed by vesication, if the application be continued for some time. As a rubefacient, and even vesicant, it is much employed in the West Indies, but is scarcely ever used with either of these intentions in this country, nevertheless applied in the form of cataplasm, it is a convenient and effectual counter-irritant. Its use as a stimulant will be considered in the chapter on General Stimulants.

CROTONIS TIGLII OLEUM.—*Croton oil* (described in the division *Cathartics*), rubbed on the skin produces redness and inflammation of the part to which it is applied, which are followed by a copious pustular eruption. It is applicable to all cases in which we wish to produce speedy and active counter-irritation, but it should not be applied to the face or scalp, as in more than one instance I have seen it produce erysipelatous inflammation of these parts. Lafargue cures nævi by inoculation with croton oil; five or six punctures are made on and around the tumour with a lancet dipped in the oil, just as in vaccination. Each puncture immediately causes a pimple, which in 36 hours is developed into a little boil: these boils unite and form a hot painful tumour, covered with white crusts. Two days afterwards the scabs separate, and in lieu of the nævus is seen an ulcer which is to be treated on general principles. It would be dangerous to make more than six punctures on a very young infant, as the irritation and fever are considerable.—To prepare a liniment of croton oil, one part may be rubbed up with seven of olive oil, a combination sufficiently powerful for general employment, four minims of oil of bitter almonds, or ten of oil of lemons being added to each ounce to give it an agreeable odour; in hospital or dispensary practice, linseed oil may be used instead of olive oil. A plaster, prepared by melting with a gentle heat four parts of diachylon plaster, and incorporating with it one part of croton oil, spread on calico, and applied to the surface of the body, will produce a pustular eruption in about 24 hours. It is a convenient and excellent way of employing this counter-irritant.

Linimentum Crotonis, D. (Croton oil, f℥j.; oil of turpentine, f℥vij.; mix them with agitation.) Olive oil or linseed oil, as above directed, may be substituted for the oil of turpentine should the odour of the latter be objectionable.

EUPHORBIA, E.—*Concrete resinous juice of undetermined species of Euphorbia. Euphorbium.* In Africa euphorbium is procured from *Euphorbia officinarum* and *Euphorbia antiquorum;* in the Canaries it is obtained from *Euphorbia canariensis.* The genus belongs to the Natural family *Euphorbiaceæ,* and to the Linnæan class and order *Monœcia Monandria.*

BOTANICAL CHARACTERS.—The pieces of the branches which we find mixed with the gum are 4 to 5 angled, with dark, shining spines, double. The genus is characterized by its monœcious heads of flowers surrounded by an involucrum of one leaf with five divisions, including several barren flowers with one fertile; Capsule 3-seeded.

PREPARATION.—It is obtained in the neighbourhood of Mogadore (from whence it is chiefly brought to this country), by making incisions into the stem and branches, from which a milky juice exudes; this juice concretes on the tree into a yellow gum, and is gathered when quite dry. So intensely acrid is the gum, that those who gather it are obliged to tie a cloth over their mouth and nostrils.

PHYSICAL PROPERTIES.—Euphorbium is in tears or small irregular masses, roundish, and angular, somewhat friable; of a dull, yellow colour, and pierced with small holes, formed by the spine of the branch on which they concrete. It has a weak odour, but a very acrid and burning taste; the powder snuffed into the nostrils produces much irritation, with incessant sneezing.

CHEMICAL PROPERTIES.—Euphorbium consists principally of resin the active ingredient, with wax, some caoutchouc, and salts of lime and potash. The pure resin is soluble in alcohol, but water has no action on it. Euphorbium melts when exposed to heat, is inflammable, and burns with a bright flame, and rather agreeable odour.

THERAPEUTICAL EFFECTS.—Applied to the surface of the skin it causes much irritation, but does not vesicate or produce any eruption; if the cuticle, however, had been previously removed, its application gives rise to a purulent discharge. It may be employed mixed with lard with much advantage as an issue ointment, or for keeping up a discharge from blistered surfaces, being cheap and certain in its effects. For an issue ointment, 25 to 30 grains should be rubbed up with an ounce of lard, and the strength may be increased or diminished according to circumstances. Euphorbium possesses the advantage over the preparations of cantharides, that it does not irritate the urinary organs; and over savin ointment that it does not spoil by keeping. The facility with which we can increase or reduce its strength is also of great importance. Nevertheless this drug has been omitted from the last edition of the Dublin and London Pharmacopœias, so rarely is it now used in medicine.

IPECACUANHA (described in the division *Emetics*), is an excellent counter-irritant, though sometimes uncertain in its action; applied in the form of liniment, prepared as directed below, it produces an eruption of minute vesicles on an inflamed base in from 36 to 48 hours, which fade away in three or four days. It possesses the advantage of not causing much pain or constitutional irritation.

Linimentum Ipecacuanhæ, (Ipecacuan, in very fine powder, ℥ss.; axunge, ʒij.; olive oil, f℥iss.; mix.) A fourth part of this should be rubbed well into the part it is desired to irritate, three or four times a-day.

MEZEREUM.—*Mezereon* (described in the division *Diaphoretics*). The inner bark of the stem and branches is much employed on the continent as a vesicatory, but as in the dry state its effects are uncertain and slowly produced, it is not used in this country as such. In France, in order to produce a blister with this substance, a piece of the bark is softened in warm water or in vinegar, and applied to the part with a compress and roller; at first the bark is renewed night and morning, but when the blister is produced it is changed only once daily. An issue ointment is also prepared with it, by digesting for 12 hours the sliced bark in axunge and white wax liquefied together, and straining.

MOXA.—*A term borrowed from the Chinese, by whom it was used to designate a cylinder of a cottony substance, which they obtained from the leaves of Artemisia moxa.* This is a small shrub, a native of China, belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua.*

PREPARATION.—Moxas are prepared in China and Japan, from whence we have derived the use of them, by pounding the downy covering of the leaves until it resembles fine cotton, and rolling into small conical masses. In this country they are prepared either from the pith of the stem of the *Helianthus annuus*, the common sunflower, or by soaking cotton-wool in a concentrated solution of nitre, and forming into small masses of the same shape as the Chinese moxas. More recently Professor Osborne of this city has proposed the use of fresh burned quick-lime, as a substitute for the common moxa, (*Dublin Journal, first series*, vol. xx., p. 409). On the continent a piece of linen soaked in a concentrated solution of acetate of lead, dried and rolled into the proper shape, is usually preferred in the present day. A conical-shaped piece of camphor also forms an excellent moxa.

EFFECTS AND USES.—The first sensation felt on the application of a moxa is rather agreeable, but it soon causes intolerable pain, which, however, does not last long. Redness and inflammation of the part to which it is applied are produced, and an eschar formed immediately under the spot on which it has been placed, which extends to a considerable depth if the moxa be kept long in contact with the skin. The eschar separates in from eight to ten days, the process of inflammation set up for its discharge being attended with more or less suppuration, according to circumstances; and a discharge of purulent matter may be established after the separation of the eschar by the application of irritating unguents, or by the insertion of issue peas. Moxas differ from the actual cautery in that their effects are produced more slowly, and that the inflammation caused by them penetrates more deeply. The principal diseases in which the application of moxas has been found beneficial are, in Pott's curvature of the spine, in inveterate sciatica, in neuralgia, in paraplegia, in chronic inflammation of the joints, in amaurosis, &c. The good effects produced by moxas depend on the principle of counter-irritation. Their use is contra-indicated in all acute inflammatory diseases. Of late years they have not been much employed.

MODE OF EMPLOYMENT.—The apex is set on fire, and the base kept firmly applied to the skin by means of a piece of wire or a pair of forceps; the neighbouring parts should be covered with wet pieces of linen to protect them from the sparks; the combustion may be quickened by the blow-pipe or with the breath. Professor Osborne applies the quick-lime moxa as follows:—"Some quick-lime in powder, to the depth of about half an inch, is placed on the skin inside a *porte moxa*, or a strip of card bent together and tied so as to form a circle; some water is dropped on and mixed with it. The ordinary lime from a lime-kiln answers well if fresh." Moxas should be applied as close to the seat of the disease as possible;

Baron Larrey considers that their application to the following parts of the body is improper :—To the head where the skull is covered with skin and pericranium only ; to the eyelids, nose, ears, larynx. trachea, sternum, glandular parts of the breast, linea alba, over the course of superficial tendons, articular prominences where there is danger of injuring the articular capsules, and projecting points of bone. To these may be added, immediately over the course of large arteries, veins or nerves.

RUTA GRAVEOLENS.—(Described in the division *Antispasmodics*). The fresh leaves may be employed as a local stimulant and rubefacient.

SABINA.—*Savin* (described in the division *Emmenagogues*) acts as a powerful local irritant. It is very generally employed in the form of ointment or cerate for keeping up the discharge from a blistered surface, producing what is termed a *perpetual blister*. Owing, however, to the difficulty in preparing the ointment well, and to its losing its properties by long keeping, an ointment prepared with euphorbium (see page 263) may be preferred for that purpose ; one part of powdered savin combined with two parts of finely powdered alum, forms an excellent application to venereal vegetations: it is sprinkled over the part, and the application renewed twice daily, simple dressing being applied in the interval.

PHARMACEUTICAL PREPARATIONS :—*Unguentum Sabinæ*, D. L. *Ceratum Sabinæ*, E. (" Savin tops, dried and in powder, ʒj. ; ointment of white wax, ʒvij ; mix the powder intimately with the ointment by trituration," D. " Fresh savin, bruised, ℔ss. ; white wax, ℥iij.; lard, ℔j. ; mix the savin with the wax and lard melted together, and express through a linen cloth," L. " Fresh savin, 2 parts; bees' wax, 1 part; axunge, 4 parts; melt the lard and wax together; add the savin; boil till the leaves become friable; and strain through linen or calico," E.) When well prepared this ointment is of a fine green colour, and has the peculiar odour of savin well marked.

SETONS and ISSUES are employed to produce derivation from some internal organ, by causing a discharge of pus from the surface of the body, as in deep-seated local inflammations; and to establish a drain from the system in many diseases. With the former intention they are employed in ophthalmia, in chronic inflammation of the ear, in diseases of the brain and spinal marrow, in caries of the vertebræ, in chronic articular inflammation, in white swelling, in hip-joint disease, &c. With the latter, in apoplexy, epilepsy, chorea, spasmodic asthma, phthisis, hepatitis, &c. When setons or issues are employed in local diseases, they should be applied as near their seat as practicable ; but when used in general affections, they may be inserted in whatever part of the body is most convenient: thus, setons may be inserted into the nape of the neck, and issues in the inside of the leg or arm.—The introduction of a seton is easily effected with a seton needle, an instrument shaped like a lancet, about three inches long, 3-8ths of an inch broad, slightly curved, and having an eye in the handle ; a fold of the integuments being held up, the needle is forced through, and by its means a skein of silk, or a piece of India-rubber or Gutta Percha tape, sufficient to fill the aperture, introduced through the wound ; a fresh portion of the material inserted is drawn through the aperture daily, and if it do not produce sufficient irritation, it may be smeared with some irritating ointment. Issues are more employed at present than setons ; the manner in which they are inserted has been explained before, (see page 168.)

SINAPIS.—*Mustard* (described in the division *Emetics*), applied to the surface of the body acts as a local irritant, producing inflammation attended with much pain ; and if the application be long continued, vesication with even ulceration and gangrene. It is very generally employed in the form of cataplasm, or as it is technically called *sinapism*, to produce counter-irritation : applied to the soles of the feet or calves of the legs, in the low state of typhus fever, especially when stupor or delirium is present, in apoplexy and coma, in narcotic poisoning, and in other cases in which there is determination to the head. It is also often applied to the chest with much benefit in many pulmonary and cardiac diseases, and to the surface of the abdomen in painter's colic and other affections of the abdominal viscera. Sinapisms are prepared by mixing common table mustard with lukewarm water, and spreading the paste on a piece of linen or brown paper. They produce a counter-irritant effect in from fifteen to twenty minutes after they have been applied; but the length of time which they should be left on, may be regulated by the feelings of the patient; if he is insensible, however, they should be removed as soon as the skin is reddened. The following form for preparing sinapisms is contained in the last edition of the London Pharmacopœia :—

Cataplasma Sinapis, L. (Boiling water, f℥x. ; linseed meal, and mustard, of each, ℥iiss. or a sufficiency; add the water to the powders previously mixed together, stirring so as to make a cataplasm.)

SUCCINI OLEUM.—*Oil of Amber* (described in the division *Antispasmodics*), is an active rubefacient, producing irritation and slight inflammation of the skin when applied with friction. It is sometimes employed in chronic rheumatism and paralysis ; but its most general use is as a local application in hooping cough, in the following form, commonly known as *Roche's embrocation* :—Oil of amber, fʒiij. ; oil of cloves, fʒj. ; olive oil, f℥j. ; mix.

TEREBINTHINÆ OLEUM.—*Oil of Turpentine* (described in the division *Anthelmintics*), is a speedy and effectual rubefacient, producing active inflammation, succeeded by a crop of small pimples, and sometimes minute blisters, when applied to the surface of the body. If it be applied warm it acts more quickly and more powerfully. As a counter-irritant, it is very generally and very beneficially employed in inflammatory attacks of the thoracic or abdominal viscera, in colic and peritonitis, in sore throat, in chronic rheumatism, in neuralgia, &c.

Linimentum Terebinthinæ, D. L. E. (" Oil of turpentine, f℥v. ; ointment of resin, ℥viij. ; melt the ointment, then add the oil of turpentine gradually, and stir the mixture until a uniform liniment is obtained," D. " Soft soap, ℥ij. ; camphor, ℥j. ; oil of turpentine, f℥xvj. ; shake them together until they are mixed," L. " Oil of turpentine, f℥v. ; resinous ointment, ℥iv. ; camphor, ℥ss. ; melt the ointment and gradually mix with the oil and camphor till a uniform liniment be formed," E.) This liniment is powerfully stimulating ; it was first proposed by Kentish as an immediate dressing for extensive burns, particularly when the vital powers are sinking, and for this purpose it is employed with much advantage ; the parts are first smeared with oil of turpentine, and pledgets of lint covered with this liniment are then applied. It is also used as a counter-irritant, applied with friction in rheumatic and neuralgic pains.

St. John Long's liniment, (The yolk of one egg ; oil of turpentine, f℥iss. ; strong acetic acid, f℥j. ; pure water, f℥iij. ; first rub the yolk of egg, the water, and the acetic acid together, then add the oil of turpentine, and agitate the whole until they are well mixed :—or, oil of turpentine, and distilled vinegar, of each, equal parts ; yolk of egg, sufficient to make a uniform emulsion.) This excellent counter-irritant liniment is applied by means of a sponge ; its effects vary with the force which is used in rubbing, and with the length of time the application is continued ; the principal objection to its use is its very disagreeable smell, which may be somewhat obviated, and its rubefacient powers at the same time rather increased, by the addition of a drachm of oil of rosemary.

CHAPTER XIII.

EXPECTORANTS.

(Pectorals.)

EXPECTORANTS may be defined, medicines which promote the secretion from the bronchial tubes and air passages, and facilitate its discharge. No peculiar drugs have been as yet discovered which, by a direct or *specific* action on the lungs, produce expectoration; the medicines which are employed with this intention act relatively, that is to say, they operate through the medium of the system generally, for the most part relieving or removing that state of disease which demands the use of expectorants. It has been indeed asserted that certain substances are eliminated through the bronchial mucous membrane, and that in this manner the natural mucous secretion is augmented when they are taken into the circulation whether by absorption from the digestive canal or otherwise; but such an assertion is only conjectural, for I am not aware that their presence in the bronchial secretion has been ever detected by direct chemical experiment. It is true that the breath emits or retains the smell of many substances, which have a powerful or peculiar odour, for several hours after they have been swallowed, such as garlic, onions, the balsams, and most of the volatile oils, but this is no proof that their odorous principle is exhaled by the pulmonary mucous membrane, nor should they, therefore, be regarded as expectorants. In fact most agents which are arranged in this division are derived from other classes of medicines, and there are no remedies more uncertain in their action. There are two modes in which remedies employed to promote expectoration appear to act: first by removing constriction of the pulmonary exhalent vessels, on which principle the nauseating expectorants seem to produce their effects; or secondly, by stimulating these vessels, they either increase the natural exhalation where it is deficient, or alter its character where it is in an unhealthy state. To these we may add a third, including all emetics, which by their mechanical action dislodge accumulated secretions from the respiratory organs, and thus frequently become most valuable agents in the treatment of many diseases, which demand the use of expectorants.

ACIDUM BENZOICUM, D. L. E.—*Benzoïc acid. Flowers of Benjamin. An acid prepared by sublimation from Benzoïn,* L.

PREPARATION.—An article of the Materia Medica in the London Pharmacopœia.—*Dublin.* "Benzoïn, 5 parts; recently burned lime; and muriatic acid, of each, 1 part; water, 200 parts; rub the benzoïn with the lime, boil for half an hour in 130 parts of water, constantly stirring; let the vessel rest and pour off the liquor when cold; boil the remainder in 70 parts of water, and again pour off the liquor when cold; boil the mixed liquors to one half, filter through paper, and add gradually the muriatic acid to the liquor when cold; lastly, the liquor being poured off, wash the powder with a small quantity of cold water, dry with a gentle heat, and sublime the benzoïc acid in a proper vessel with a slow fire." *Edinburgh.* "Benzoïn, any convenient quantity; put it into a glass matrass; and by means of a gradually increasing heat, sublime as long as anything rises; squeeze the sublimate between folds of blotting paper to remove the oil as much as possible, and sublime the residuum again."

PHYSICAL PROPERTIES.—In the form of soft, elastic, pearl-white, satiny crystals or scales; having a faint aromatic odour, resembling that of benzoïn, and an acid, penetrating taste. Sp. gr. 0·667.

CHEMICAL PROPERTIES.—Its composition is $C^{14}H^5O^3$, combined in the crystalline state with one equivalent of water. It is permanent in air; at a temperature of 248° fuses, and at 293° sublimes; heated in the open air it produces an acrid white vapour which irritates the fauces; it is very inflammable, and burns with a fuliginous flame, leaving no residue. Benzoïc acid requires 200 parts of cold water, and 20 of boiling water for its solution; it dissolves in 2 parts of cold alcohol or ether, and in a less quantity of acetic acid or oil of turpentine. It possesses the usual characteristics of a weak acid.

ADULTERATIONS.—It is not liable to adulteration, but is often badly prepared; when good it is colourless, entirely sublimed by a gentle heat, and completely soluble in solution of potash or in lime water. The following are the characteristics and tests given in the last edition of the London Pharmacopœia for benzoïc acid:—"White or nearly so; on the application of heat it volatilizes, exhaling a peculiar odour. Scarcely soluble in water, freely so in rectified spirit. It is likewise soluble in solutions of ammonia, potash, soda, and lime, from which it is precipitated by hydrochloric acid."

THERAPEUTICAL EFFECTS.—Although formerly highly esteemed as a stimulating expectorant in chronic bronchitis, benzoïc acid is scarcely ever employed in the present day, except in preparing the *Tinctura opii camphorata,* D. E., *Tinctura camphoræ composita,* L., and the *Tinctura opii ammoniata,* E., in all of which preparations it is an ingredient.*

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* Dr. Ure, of London, a few years ago called the attention of the profession to the chemical change which takes place in the composition of the urine when benzoïc acid is taken into the stomach: namely, the conversion of the insoluble *uric acid* and its salts into the soluble *hippuric acid* and *hippurates.* He therefore proposed its employment in all cases, accompanied by increased secretion of uric acid, as in gout, rheumatism, and calculous disorders. In a case of uric acid gravel, in which I employed benzoïc acid, the deposit in the urine apparently ceased while the use of the acid was continued; but returned to a greater extent than before when its administration was stopped. From the experiments of Keller, Booth, Boyé, and others, it has been shown that

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xxx.; it should be dissolved in a large quantity of water, as otherwise it is apt to irritate the fauces; its solubility is much increased by combining it with phosphate or biborate of soda.

INCOMPATIBLES.—Alkalies, and their carbonates, metallic salts, &c.

ANTIMONII ET POTASSÆ TARTRAS.—*Tartar emetic* (described in the division *Diaphoretics),* administered in small doses, from 1-16th to 1-10th of a grain frequently repeated, operates as an expectorant, but its effects as such are more certainly manifested, if it be given so as to produce nausea. It is best adapted for *acute* attacks of inflammation of the substance of the lungs or of the bronchial mucous membrane.

BALSAMUM PERUVIANUM, L. E.—*Balsam of Peru. A balsam flowing from incisions into the trunk of an uncertain species of Myrospermum,* L. *Fluid balsamic exudation of Myrospermum peruiferum,* E. The late Dr. Pereira investigated with some pains the history of the tree from which this balsam is procured, and in 1850 he received from a merchant residing on the San Sonate coast of San Salvador—in the republic of Guatiamala—specimens of the leaves and fruit of the tree by which the balsam is there yielded; it is a variety of Myrospermum before undescribed, which I quite agree with a happy suggestion of the late Dr. Royle should now be named Myrospermum Pereiræ. It belongs to the Natural family *Leguminosæ (Fabaceæ,* Lindley), and to the Linnæan class and order *Decandria Monogynia.* From Dr. Pereira's investigations it would appear that Peruvian balsam is altogether obtained from the district above referred to, and not at all from Peru.

BOTANICAL CHARACTERS.—A lofty, handsome, branching tree, with a smooth, thick, very resinous bark; Leaves alternate, pinnated, consisting of eleven leaflets, which are ovate, blunt, and downy on their midrib and petiole; Flowers white, in axillary racemes; Fruit, a legume.

PREPARATION.—It is usually stated to be procured in two ways; the finest, which is not met with in British commerce, by incisions made into the bark of the tree; the second quality, by boiling the young branches and the bark of the trunk in water: many pharmacologists, however, doubt that any of it is procured by the latter method. Nouvel, who was for many years engaged in collecting balsam of Peru on the Balsam Coast of San Sonate, states that the Indians procure it by inserting cotton rags into large incisions made through the bark of the tree, and lighting a fire around the stem to liquefy the balsam which, flowing out, saturates the rags; these are afterwards boiled in water, when the balsam falls to the bottom.

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although benzoïc acid is converted into hippuric acid in the system, and excreted by the kidneys in this form, the secretion of uric acid is not affected either in regard to its quantity or chemical properties by it; whence it results that benzoïc acid cannot be regarded as a remedy for uric acid diseases.

PHYSICAL PROPERTIES.—Balsam of Peru, as it occurs in English commerce, is a thick, semi-transparent, heavy liquid, of a blackish colour, with a golden lustre. It has an agreeable aromatic odour and a warm, bitterish taste. Specific gravity about 1·60.

CHEMICAL PROPERTIES.—According to the analysis of Fremy, it is composed of an oily matter which he has named *cinnameïne*, of *cinnamomic* acid (*Benzoic* acid of previous chemists), and one or more resins. Exposed to the air it becomes more dense, but does not dry up ; is inflammable, burning with a bright flame and much smoke, and diffusing a very agreeable smell; it is insoluble in cold water, but water boiled with it acquires its agreeable odour. The balsam is soluble in alcohol in all proportions, but is only partially dissolved by ether.

ADULTERATIONS.—It is said to be adulterated with alcohol ; this fraud is known by its low density, and by its losing volume when mixed with cold water.

THERAPEUTICAL EFFECTS.—Balsam of Peru is a mildly stimulating expectorant, and as such was at one time much employed in chronic bronchitis, in the advanced stages of phthisis, and in old asthmatic cases ; it has, however, completely fallen into disuse as an internal remedy. (See, also, *General Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—Min. xx. to min. xl., suspended in aqueous vehicles, by means of mucilage or yolk of egg.

BALSAMUM TOLUTANUM, D. L. E.—*Balsam of Tolu. Concrete balsamic exudation of Myrospermum toluiferum.* This tree is a native of the mountainous district of Tolu, Turbaco, and the neighbourhood of the river Magdalena ; it belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—Precisely similar to Myrospermum peruiferum, except the Leaves, which are oblong, acuminated, and smooth upon the petiole and midrib.

PREPARATION.—It exudes in the liquid state from incisions made into the bark of the tree, but it soon concretes on exposure to the air.

PHYSICAL PROPERTIES.—In solid masses of a resinous appearance, and a reddish or yellowish-brown colour. It has a peculiar fragrant odour, more agreeable than the balsam of Peru, and a sweet aromatic taste.

CHEMICAL PROPERTIES.—Its composition is the same as that of the balsam of Peru. Balsam of Tolu becomes more solid by exposure to the air, melts by heat, and is inflammable, burning with a fuliginous flame and a very agreeable odour. It is soluble in alcohol and ether ; and boiling water dissolves out its fragrant acid.

THERAPEUTICAL EFFECTS.—Balsam of Tolu is a stimulating expectorant, and in consequence of its agreeable flavour, is very much used as an adjunct to pectoral mixtures ; but it should not be employed when there is any inflammatory action present.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx. ; it is best administered suspended in aqueous vehicles by means of mucilage or yolk of egg.

Tinctura Tolutana, D. L. E. (" Balsam of Tolu, ℥ij. ; rectified spirit, Oj. ; dissolve the balsam in the spirit with the aid of a gentle heat, let it stand until the sediment subsides, then decant the clear tincture," D. " Balsam of Tolu, ℥ij. ; rectified spirit, Oij. ; macerate until the balsam is dissolved and filter," L. " Tolu balsam, in coarse powder, ℥iiiss ; rectified spirit, Oij. ; digest the balsam in the spirit with a gentle heat till it be dissolved, and filter," E.) Dose, fʒj. to fʒij. ; it is precipitated when added to water, but may be suspended in water by means of mucilage or syrup.

Syrupus Tolutanus, D. L. E. (" Take of balsam of Tolu, ℥j. ; distilled water, Oj. ; refined sugar, in powder, as much as is sufficient : boil the balsam in the water for half an hour, in a lightly covered vessel, occasionally stirring, and strain the liquor when cold ; then, having added to it twice its weight of sugar, dissolve with the aid of a steam or water heat," D. " Balsam of Tolu, ʒx. ; boiling distilled water, Oj. ; sugar, ℔iiss. ; boil the balsam in the water for half an hour in a covered vessel, frequently stirring, and strain the cooled liquor ; then add the sugar and dissolve it," L. " Tincture of Tolu, ℥j. ; simple syrup, ℔ij. ; when the syrup has been recently made and has not altogether cooled, add the tincture by degrees, agitating briskly," E.) Dose, fʒij. to f℥ss. ; merely used as a flavouring adjunct. Tolu lozenges prepared with the syrup and sufficient gum are a popular and useful remedy in chronic coughs.

BENZOINUM, D. L. E.—*Benzoïn. The concrete exudation*, D., *Concrete balsamic exudation*, L. E.—*of Styrax benzoïn.* A native of Sumatra, Borneo, and Java ; belonging to the Natural family *Ebenaceæ (Styracaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A tall tree with rounded branches, and a downy bark ; Leaves entire, pointed, tomentose beneath ; Flowers, in compound axillary racemes.

PREPARATION.—The balsamic exudation is procured by making incisions into the bark of the tree in its seventh year, and allowing the liquid which exudes to concrete on the stem ; when quite hard it is removed, and fresh incisions made, by which an inferior quality is obtained.

PHYSICAL PROPERTIES.—Benzoïn occurs in large masses of a reddish-brown colour externally, with a waxy, somewhat shining fracture, presenting many whitish amygdaloid tears cemented together by a reddish substance ; the inferior qualities contain but few tears and are of a more uniform reddish-brown colour all through. The French pharmaceutists describe another variety in tears of a pale yellow colour, but it is not met with in the English market. Benzoïn has an agreeable aromatic odour, and a sweet balsamic taste ; the odour and taste of the inferior qualities are much less agreeable. Specific gravity about 1·065.

CHEMICAL PROPERTIES.—It is composed of 28 per cent. of resin soluble in ether, 50 of resin insoluble in ether, and nearly 14 of benzoïc acid, with a trace of volatile oil, aromatic extract, &c. (Kopp). Benzoïn is permanent in the air; heated, it fuzes and benzoïc acid is sublimed; is inflammable, and burns with a fuliginous flame, and an agreeable odour. It is partly soluble in alchol, ether, and acetic acid; boiling water dissolves out the benzoïc acid.

THERAPEUTICAL EFFECTS.—Benzoïn is a stimulating expectorant, formerly much used in chronic cough, in old cases of bronchitis, and in the advanced stages of phthisis; in the present day it is not much employed. Like the other stimulating expectorants, it is inadmissible in inflammatory cases.

DOSE AND MODE OF ADMINISTRATION.—It is not used in the solid state. Lately benzoïn has been judiciously suggested by Mr. Erasmus Wilson of London as an addition to prepared lard with the view of preventing the lard from becoming rancid when employed as the basis of ointments in the treatment of diseases of the skin.

Tinctura Benzoïni composita, L. E. ("Benzoïn, in coarse powder, ℥iiiss. ; prepared storax, ℥iiss. ; balsam of tolu, ʒx. ; socotrine or hepatic aloes, in coarse powder, ʒv. ; rectified spirit, Oij. ; macerate for seven days and filter," L. "Benzoin, in coarse powder, ʒiv. ; Peru balsam, ℥iiss. ; East Indian aloes, ℥ss. ; rectified spirit, Oij. ; digest for 7 days, pour off the clear liquor and filter it," E.) A stimulating expectorant; Dose, fʒss. to fʒij., as an adjunct to pectoral mixtures; it is precipitated by water, but may be mixed with water by means of mucilage, yolk of egg, or syrup. This tincture was formerly much employed as an application to wounds and contusions, under the name of *Friar's Balsam.*

IPECACUANHA (described in the division *Emetics*), administered in small but frequently repeated doses, a fourth of a grain to half a grain, acts as an expectorant, but its effects as such are much more surely manifested if nausea be at the same time produced. In some cases of chronic inflammation of the bronchial mucous membrane, accompanied by profuse secretion, it operates beneficially, not by promoting expectoration, but by diminishing the discharge, and by some specific action restoring the parts to a healthy state. In acute or inflammatory diseases of the lungs or bronchial tubes, ipecacuanha to prove beneficial must be given in doses sufficient to produce nausea or even vomiting; but in chronic affections of the same parts, more advantage will be derived from smaller doses. As an expectorant, the doses of ipecacuanha and its preparations are as follows:—In *powder*, gr. ¼th to gr. ij.—*Vinum Ipecacuanhæ*, D. L. E., min. x. to min. xl.—*Syrupus Ipecacuanhæ*, E., fʒj. to f℥ij.

Pilula Ipecacuanhæ cum Scillâ, L. (Compound powder of ipecacuanha, ℥iij. ; squill, fresh bruised ; and ammoniacum, bruised, of each ʒj. ; treacle, a sufficiency ; beat together till they are incorporated.) The *compound ipecacuan pill* of the former London Pharmacopæia. A useful stimulating expectorant in habitual cough affecting the old and debilitated. Dose. gr. v., three or four times a day. Every five grains contain about a fourth of a grain each of ipecacuan and opium.

LOBELIA, D. L. E.—*Lobelia. Indian tobacco. The herb (Flowering herb,* L. *(of Lobelia inflata.* A native of the United States, where it is a very common weed growing on road sides and in neglected fields; it belongs to the Natural family *Lobeliaceæ,* and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Annual, 1–2 feet high, with a branching stem; Leaves, scattered, alternate, oblong; Flowers, pale blue, in terminal racemes; Capsules, ovoid, inflated.

PREPARATION.—The entire herb is collected in the end of August, as soon as the capsules are formed, and carefully dried. It is imported from America compressed into rectangular masses, being prepared for exportation by the Shaking Quakers of New Lebanon in the State of New York.

PHYSICAL PROPERTIES.—Its odour is faint but disagreeable, and the taste at first insipid, but when chewed, very acrid, and resembling that of tobacco, causing, like it, a flow of saliva and a nauseating effect on the stomach.

CHEMICAL PROPERTIES.—According to the analysis of Mr. Proctor, lobelia contains an acrid volatile oil, a peculiar principle named by him *Lobelina,* lobelic acid, gum, resin, fixed oil, chlorophylle, extractive, and various salts. Reinsch, who has since analysed this plant, named the active principle he obtained *Lobeleïn;* he procured it by the successive action of alcohol, ether, and water; it is a shining-yellow hygroscropic substance, he says, nearly analogous to the active principle of tobacco; from its chemical reaction it would, however, appear to be a compound substance. Mr. W. Bastick has more recently ascertained the existence in Lobelia of an alkaloid, which, like Conia, is an oily, transparent, volatile fluid; this he names *Lobelina;* it has the odour of the herb, and a pungent, tobacco-like taste, and in minute doses produces all the marked and poisonous action of the plant. The active properties of lobelia are soluble in water, alcohol and ether.

THERAPEUTICAL EFFECTS.—Lobelia was employed by the native Indians of North America as an emetic, but its action as such is highly irritating and attended with much danger, for if it fail to excite vomiting soon after it has been taken, it produces all the symptoms of a powerful narcotico-acrid poison, and so small a quantity as a teaspoonful of the powdered leaves has proved fatal in some instances. In small doses, however, it is a most valuable sedative expectorant, apparently possessing a specific power in allaying spasm of the bronchial tubes. It is therefore employed with most benefit in paroxysmal diseases of the lungs, as in asthma and hooping-cough; it has also proved serviceable in the obstinate cough of chronic bronchitis, and in the latter stages of croup. Of late years Lobelia has been used as a specific for all diseases by a sect of quacks in England, appropriately named after their leader *Coffinites,* and as a result of their treatment numerous individuals have been poisoned.

DOSE AND MODE OF ADMINISTRATION.—Lobelia may be given in powder, in which form I have found its action to be certain and uniform, acting as a sedative expectorant in doses of from gr. j. to gr. ij. three or four times in the twenty-four hours. From ten to twenty grains cause vomiting, and a larger dose produces extreme prostration ; the dose, as an expectorant, is from gr. j. to gr. v.

Tinctura Lobeliæ, D. L. E. (" Lobelia, dried, and in coarse powder, ℥v. ; proof spirit, Oij. ; macerate for fourteen days, strain, express and filter," D. " Lobelia, powdered, ℥v. ; proof spirit, Oij. ; macerate for seven days, express and filter," L. " Dried lobelia, in moderately fine powder, ℥v. ; proof spirit, Oij. ; this tincture is best prepared by the process of percolation as directed for tincture of capsicum, but it may be made also in the usual way of digestion," E.) Dose, fʒss. to fʒj. ; larger doses are apt to prove emetic.

Tinctura Lobeliæ Æthereu, L. E. (" Lobelia, powdered, ℥v. ; ether, f℥xiv. ; rectified spirit, f℥xxvj. ; macerate for seven days, express and filter," L. " Dried lobelia, in moderately fine powder, ℥v. ; spirit of sulphuric ether, Oij. ; best prepared by percolation as directed for tincture of capsicum ; but it may be also obtained by digestion in a well-closed vessel for seven days," E.). Dose, min. xx. to min. xl. This preparation is usually preferred in asthmatic cases, in consequence of the sedative properties of the sulphuric ether, but I think I have derived more benefit from prescribing the alcoholic tincture in combination with Hoffman's anodyne liquor.

In cases of poisoning with lobelia, the most active stimulants, both internal and external, should be employed.

MARUBIUM VULGARE.—*White Horehound.* This plant is now omitted from all the British Pharmacopœias, though still retained in many of the Continental ; it is indigenous, growing in waste places and by road sides, belonging to the Natural family *Labiatæ* (*Lamiaceæ,* Lindley), and to the Linnæan class and order *Dydynamia Gymnospermia.*

BOTANICAL CHARACTERS—About a foot and a-half high, everywhere hoary with white thick pubescence or woolliness ; Flowers, small, white, in crowded whorls.

PROPERTIES.—The whole plant has a peculiar aromatic odour, and a very bitter balsamic taste. Its properties depend on volatile oil and extractive, it also contains tannic acid ; it yields its virtues to boiling water and to alcohol.

THERAPEUTICAL EFFECTS.—White horehound was long held in high estimation as a tonic expectorant. In the present day it is commonly employed as a domestic remedy in chronic coughs ; but is scarcely ever used in regular practice. It is generally given in the form of infusion, *Horehound tea,* prepared by infusing ℥j. of the herb in Oj. of boiling water for an hour, of which the dose is f℥iij. or f℥iv., sweetened with sugar ; or in the form of confection, *Candied Horehound,* prepared by evaporating a strong syrup of the herb to dryness ; a small bit of this may be allowed to dissolve in the mouth frequently.

INCOMPATIBLES.—The sesqui-salts of iron : ipecacuanha and tartar emetic.

SCILLA.—*Squill* (described in the division *Diuretics*), in small doses frequently repeated, promotes the secretion of the bronchial mucous membrane ; it is not, however, a stimulating expectorant as has been very generally stated, and may be therefore prescribed in the acute and subacute stages of pulmonary affections as well as in the chronic. It proves more serviceable in the bronchitis and pneumonia of children than in the same diseases in adults. From the property which squill possesses of promoting the secretion of mucus, it facilitates expectoration in some forms of asthma and chronic bronchitis in which the sputa are viscid ; in these cases it is advantageously combined with the more stimulating remedies of this class. The dose of powdered squill as an expectorant should not exceed gr. j. frequently repeated. The oxymel or syrup is one of the most useful expectorants we possess for the pulmonary affections of children, in doses of min x. to min. xxx. The tincture is employed as an adjunct to pectoral mixtures in chronic bronchial affections ; Dose, min. x. to min. xxx.

Pilula Scillæ composita, D. L. ("Squill, in fine powder, ʒiiss. ; ginger, in fine powder ; ammoniacum, in fine powder ; Castile soap, of each, ʒij. ; treacle, *by weight,* ℥ss. ; reduce the soap to powder, and triturate it with the squill, ginger and ammoniac ; then add the treacle and beat them all into a mass of a uniform consistence," D. "Squill, fresh powdered, ʒj. ; ginger, powdered : ammoniac powdered, of each, ʒij ; soft soap, ʒiij. ; treacle, ʒj. ; mix the powders together ; then having added the other ingredients, beat all together into a mass," L.) Dose gr. v. to gr. xv.

Pilulæ Scillæ, E. (Squill, in fine powder, 5 parts ; ammoniac ; ginger, in fine powder ; and Spanish soap, of each, 4 parts ; conserve of red roses, 2 parts ; mix the powders, add the other articles, beat them into a uniform mass, and divide it into five grain pills.) Dose, gr. v. to gr. xv. in chronic catarrh and asthma. It spoils by keeping.

Syrupus Scillæ compositus, UNITED STATES PHARMACOPŒIA. (Squill, bruised ; seneka, bruised, of each, ℥iv. ; tartar emetic, gr. xlviij. ; water, Oiv. ; sugar, ℔iiss. ; pour the water on the squill and seneka, boil to one-half and strain ; add the sugar, evaporate the whole to Oiij., and while hot dissolve in it the tartar emetic.) This is the famous *Hive syrup* of the Americans, an excellent formula, particularly adapted for croup and chronic bronchitis in children : dose for adults, fʒj. to fʒij ; for children, min. v. to min. xv.

SENEGA, D. L. E.—*Seneka. Snake root. Root of Polygala senega.* A native of the United States ; belonging to the Natural family *Polygalaceæ,* and to the Linnæan class and order *Diadelphia Octandria.*

BOTANICAL CHARACTERS.— Root, perennial ; Stems, numerous, annual, from nine inches to a foot high ; Leaves, sessile, ovato-lanceolate ; Flowers, small, white, in spiked racemes ; Capsule, small, elliptical, containing two minute black seeds.

PHYSICAL PROPERTIES.—Seneka root varies in size from the thickness of a writing pen to that of the little finger, contorted, knotty, and marked with slight eminences on one side ; cortical portion resinous, greyish or yellowish externally, whitish internally ; central portion *(meditullium),* whitish, woody, inert. It has a faint, peculiar odour, and a taste at first mucilaginous, afterwards nauseous and acrid.

CHEMICAL PROPERTIES.—It is composed of tannic and pectic acids, wax, fixed oil, gum, albumen, colouring matter, lignin, some salts, and a peculiar acrid principle, which, according to Quevenne, consists of two volatile acids, named by him *Polygalic* and *Virgineïc* acids, the former of which appears to be the active principle of the plant ; its composition is $C^{22}H^{18}O^{11}$. Seneka yields its properties to both water and to alcohol ; according to some recent observations, it has been proved that by the continued action of boiling water on the root, part of the active principle is formed into an insoluble compound with the colouring matter and albumen ; therefore the Dublin and Edinburgh Colleges have substituted an infusion for the decoction of the former pharmacopœias.

THERAPEUTICAL EFFECTS.—Seneka root is a stimulating expectorant of much power, peculiarly fitted for the advanced stages of chronic bronchitis and of pneumonia, especially when occurring in the aged and debilitated. It is also a very valuable remedy in protracted hooping cough, and in the latter stages of croup and of bronchitis in infants and children.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss. ; this is the best form for the administration of seneka, in the pulmonary affections of children.

Infusum Polygalæ, D. *Infusum Senegæ,* E. (" Take of polygala root, bruised, ℥ss. ; boiling water, f℥ix. Digest for one hour in a covered vessel and strain. The product should measure about eight ounces," D. " Seneka, ʒx. ; boiling water, Oj. ; infuse for four hours in a covered vessel and strain," E.) An excellent vehicle for other remedies in old cases of catarrh and bronchitis. Dose, f℥ij. to f℥iij.

Decoctum Senegæ, L. (Seneka, ʒx.; distilled water, Oij.; boil down to Oj. and strain.) Not so good a form as the infusion, for the reasons above stated. Dose the same.

STYRAX, L. E.—*Storax. Liquid Balsam of an unascertained plant*, L. *Balsamic exudation of Styrax officinale*, E. The plant indicated by the Edinburgh College is a native of the Levant, Palestine, and Arabia, and cultivated in the south of Europe; it belongs to the Natural family *Ebenaceæ (Styracaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—Stem from 15 to 25 feet high, branching at the top; Leaves, alternate, ovate, villous beneath; Flowers, white in small racemes; Fruit, a coriaceous capsule, downy, one-seeded.

PREPARATION.—The process followed for obtaining storax from the tree is not accurately known, but it is supposed to be procured from incisions made into the tree, or from the punctures of insects. For use in medicine and pharmacy the storax of commerce is directed to be purified as follows in the London and Edinburgh Pharmacopœias, where it is termed, *Styrax præparata*, L. *Extractum Styracis*, E.:—"Storax, ℔j.; rectified spirit, Oiv.; dissolve and strain through linen; then distil off the greater part of the spirit with a gentle heat, and evaporate the residue in a water-bath to the proper consistence," L. "Take any convenient quantity of storax in fine powder; exhaust it by boiling it in successive quantities of rectified spirit; filter the spirituous solutions, distil off most of the spirit, and evaporate the remainder over the vapour-bath to the consistence of thin extract," E.

PHYSICAL PROPERTIES.—A great many varieties of storax have been described by pharmacologists; two most generally occur in English commerce.—1. *Liquid storax;* of this I have met with two sorts; one a greyish substance of the consistence of bird-lime, with a strong odour having some resemblance to that of naphtha, acquiring a dirty brown colour on exposure to the air; the other, a shining black, very viscid liquid, becoming more fluid when heated, with a very agreeable aromatic odour; both sorts have a pungent balsamic taste.—2. *Common storax;* this is in very friable reddish-brown masses, with an agreeable, aromatic odour, and a warm, somewhat acrid taste; it appears to be saw-dust cemented together by some liquid resin.

CHEMICAL PROPERTIES.—The medicinal virtues of storax depend on the presence of volatile oil, benzoïc acid, and resinous extractive. It yields its active properties to alcohol, but its fragrance merely to boiling water.

ADULTERATIONS.—No accurate account could be given of the adulterations of storax, so many different substances are sold under that name. The grey liquid storax is manifestly some compound of impure naphtha.

THERAPEUTICAL EFFECTS.—Formerly employed as an expectorant in the same cases as benzoïn; in the present day it is only used as an ingredient in the *Pilula Styracis composita*, L. *Pilulæ Styracis*, E. (see Opium), to conceal the odour and taste of the opium, and in the *Tinctura Benzoïni composita*, L.

CHAPTER XIV.

NARCOTICS.

(Anodynes ; Hypnotics ; Soporifics.)

NARCOTICS may be defined, medicines which produce a primary stimulating effect on the brain and heart, rapidly followed by depression of the vital powers and sleep, or if a large quantity of the narcotic be introduced into the system, by coma. The primary stage, that of excitement, varies much both as to the degree in which it is produced and as to its duration ; depending chiefly on the peculiar property of the substance employed, on the manner in which it is administered, on idiosyncracy, and on habit. Some of the medicines contained in this class, for example, belladonna, hyoscyamus, and lactucarium, stimulate the nervous system but very slightly; while others, as opium and Indian hemp, if administered in small doses repeated at proper intervals, are followed by all the effects peculiar to the action of powerful stimulants. But with reference to the latter even, when given in large doses, the stage of excitement is so short, and the depression of vital power so immediate, that it has led many to deny altogether the stimulant property of narcotics, and to regard them as producing direct sedative effects on the system. An attentive consideration, however, of the *modus operandi* of the medicinal agents described in this chapter, and a careful comparison with those which are contained in the chapter on Sedatives, must, I think, prove satisfactorily that their operation is perfectly different. Indeed some narcotics, as opium, are frequently administered with the intention of producing a stimulant action only. When given with this intention, the doses should be small, but frequently repeated, in order to sustain the state of excitement ; but when administered with the view of producing sleep, the doses should be larger, and repeated at more distant intervals. All these points, however, will be more fully explained in the description of the therapeutical effects of the individual remedies of the class. Idiosyncracy has a remarkable influence on the effects of narcotics : we meet with some individuals almost insensible to their action ; while in others, small doses produce a dangerous stupifying effect, or in some instances give rise to a degree of excitement amounting to furious delirium. But habit influences the action of narcotics on the system more than any other circumstance, their power being diminished in an extraordinary degree by repetition; when therefore their continued administration is required, it will be necessary to augment the dose gradually, in order that the usual effects may be produced. The influence of age on their action must be also borne in mind in their administration; the young being much more susceptible to the influence of narcotics than individuals of mature age. The close connection which exists between narcotics and stimulants is well exemplified in the effects of alcoholic stimulants on the system; to these which are so well known I need not refer here further than to point out the distinction that exists in their mode of operation: stimulants produce narcotism simply by their *exhausting* action on the nervous system, and to cause it they must be given in an overdose; while narcotics have a direct and specific effect on the functions of the cerebro-spinal system of nerves, allaying pain and irritation even before narcotism is produced. It is, therefore, evident that this class of medicinal agents closely resembles and partakes of the characters of both sedatives and stimulants; and no other proves so distinctly the difficulty of forming a therapeutical classification of the Materia Medica based on true scientific principles; in fact not here alone, but in medicine generally, science may often be advantageously sacrificed to practical utility.

BELLADONNA, D. L. E.—*Leaves and root*, D., *Fresh and dried leaves*, L., *Leaves*, E.,—*of Atropa belladonna. Deadly nightshade.* An indigenous plant; belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Root, fleshy, creeping; Stems, 3-4 feet high, herbaceous; Leaves, ovate, acute, entire, smooth, some very large, but placed in pairs of unequal sizes; Flowers, axillary, on short peduncles, drooping, lurid purple, about an inch long; Berries, shining, black, about the size of a black cherry, filled with a sweetish pulp, in which are imbedded many kidney-shaped seeds.

PREPARATION.—The root, which is contained in the *Dublin Pharmacopœia* only, is scarcely ever used at present; it should be dug up in the month of March, and dried quickly. The leaves are gathered in June and July before the flowers expand, and dried with a stove heat. The London College directs "the herb which grows wild in hedges and uncultivated places, to be preferred to that which is grown in gardens."

PHYSICAL PROPERTIES.—Belladonna root is from one to two inches in diameter, and a foot or more in length; is of a grayish-white colour internally, grayish-yellow externally; and has a faint nauseous odour, and a slightly astringent bitter taste. The leaves when fresh are of a sombre-green colour, which becomes yellowish-green in drying; they have a feeble odour, and a herbaceous, somewhat nauseous taste.

CHEMICAL PROPERTIES.—The medical properties of belladonna, leaf or root, depend on a peculiar principle which has been named *atropia;* it was first discovered by M. Brandes in the leaves, in which he found it to exist in combination with malic acid, two nitrogenous extractive matters called by him *pseudotoxin* and *phytocolla,* gum, wax, chlorophylle, starch, albumen, lignin, salts, &c. ATROPIA is an article of the Materia Medica in the last edition of the London Pharmacopœia, being always prepared on the large scale by manufacturing chemists. Several processes have been proposed for obtaining it from the plant, an account of which is to be found in most recent chemical pharmaceutical works. The following by M. Rabourdin has been highly spoken of by some of the French pharmaceutists :—Bruise in a mortar the fresh leaves of belladonna, and express the juice by means of a press; expose the juice to a temperature between 180° and 190° F. to coagulate the albumen, and filter. As soon as the filtered liquor is cold, add to it caustic potash and chloroform, in the proportion of a drachm of the former and seven drachms and a-half of the latter to each pint; agitate the mixture for about a minute and set aside to rest. At the end of half an hour, the chloroform charged with the atropia will be deposited as an oily greenish fluid. Decant the supernatant liquid and replace it by a little distilled water; pour off this in its turn, and continue the washing until the water comes away limpid. Then put the chloroformic solution into a small tubulated retort and distil from a water-bath until the whole of the chloroform passes over into the receiver. The residue in the retort is to be treated with a small quantity of water acidulated with sulphuric acid : this dissolves out the atropia, leaving a greenish resinoid matter, the filtered solution passing colourless. To obtain the alkaloid in a state of perfect purity, it will be sufficient to pour into the solution a slight excess of solution of carbonate of potash, to collect the precipitate, and dissolve it in rectified spirit. Beautiful groups of needle-shaped crystals of atropia will be obtained from this solution by spontaneous evaporation. When obtained quite pure it is in white transparent prismatic crystals of a silky lustre, without odour, but possessing a nauseously bitter, acrid taste, requiring for solution 299 parts of cold water, the solution having a bitter taste and an alkaline reaction, but very soluble in alcohol and ether, and combining with acids to form salts The composition of atropia, according to Liebig, is $C^{34}H^{23}O^{6}N$. Belladonna leaves and root yield their active principles to both water and alcohol.

ADULTERATIONS.—The leaves of the *Solanum nigrum* are sometimes sold for those of the Atropa belladonna ; the former are smaller, obtuse angled, not acuminate, and are bluntly toothed, by which characters they may be readily distinguished. The following are the characters of belladonna leaves given in the London Pharmacopœia :—Oval, acute, quite entire, glabrous, fætid when bruised. With reference to atropia it is stated in the same Pharmacopœia to be, "White, in prismatic crystals, soluble in water and in rectified spirit. No certain method is yet known for ascertaining its purity."

THERAPEUTICAL EFFECTS.—Belladonna acts on the system as a powerful narcotic. In large doses it is an active poison, causing constriction of the throat with ineffectual efforts to vomit, delirium usually of a gay or mirthful character, excessive dilatation of the pupils, and then coma, which is followed by death unless active treatment be immediately employed. In medicinal doses it operates as an anodyne and calmative, diminishing pain and over-excitement of the nervous system ; with this intention it has been employed in most neuralgic and convulsive diseases, but it is not so much used at present in these affections as it formerly was. It was at one time generally stated by writers on therapeutics that belladonna should not be employed in acute inflammations or febrile affections, but more recent observations have shown that a state of inflammation in the system does not contra-indicate its use. The diseases in the treatment of which belladonna is most beneficial are the varieties of neuralgia, and spasmodic and painful affections : thus it has been found especially useful in tic-douloureux, in all forms of external neuralgic pains, in nervous palpitations, in hysteria, in epilepsy, in hooping cough, in spasmodic stricture of the urethra, in painful spasm of the *sphincter ani* when there is no fissure of the part, in dysmenorrhœa, in orchitis after the acute stage has subsided, in painful glandular enlargements, in chronic arthritis, in the flying pains of rheumatism, and in incontinence of urine in children. In all these cases, the external employment of the drug is advantageously combined with its internal administration. Belladonna has been used as a prophylactic of scarlatina when that disease rages as an epidemic, and several instances of its apparent success as such were narrated originally in Germany. Later experience has fully confirmed its powers in preventing the spread of this affection, when it breaks out in schools, or where many young persons are congregated together ; amongst the most recent investigations on this subject may be cited those of M. Lecointe of Paris, in which 2,227 children and adults had been preserved from scarlatina by its use ; those at Langendorf, in Prussia, where in the Orphan Hospital, out of 160 inmates to whom the drug was administered immediately on the breaking out of an epidemic, but two contracted the disease ; and those of Dr. Newbigging, in Watson's Institution in Edinburgh, where out of 69 children exposed to the contagion but 3 took the disease. Belladonna applied externally in the neighbourhood of the eye, causes, after the lapse of a few hours, dilatation of the pupil unattended with any disturbance of vision ; to produce this effect it is employed in the operation for cataract, in iritis to prevent adhesions from forming, and in other ophthalmic affections to enable the posterior chamber of the eye to be examined with greater facility.

The alkaloid atropia has not been given internally in medicine in consequence of its highly poisonous action, even in very minute doses. It has been used for some years on the continent, particularly in Germany, and more lately in this country, in the treatment of diseases of the eye; Mr. Wilde was the first surgeon in this country to publish his experience of its effects.* He has found a single drop of solution of atropia, No. 1, *(see below)*, dropped on the lower lid, to dilate the pupil to double its ordinary size, or rather more, in from 5 to 15 minutes after its application; the dilatation lasting for four or five days. Mr. Wilde uses the solution of atropia in the same cases as he would extract of belladonna, over which it possesses the advantages:—of being much more efficacious, and much more cleanly, and of producing neither pain nor irritation when dropped into the eye; it is also free from the objection to which extract of belladonna is liable, that of producing an unpleasant eruption around the eye-brow on which it has been applied. It should, however, be used with caution for these purposes, as a case has been published by M. Chassaignac of Paris, in which three or four drops of a solution, made with one part of atropia to 600 parts of water acidulated with acetic acid, dropped into the eye, gave rise to dangerous symptoms of poisoning.

DOSE AND MODE OF ADMINISTRATION.—Dose of the powdered leaves, gr. j., which should be increased very gradually until dryness of the throat is produced. As a prophylactic of scarlatina it is given twice a day, in doses of from $\frac{1}{8}$th to $\frac{1}{3}$rd of a grain, according to the age of the child. Atropia as above stated is only used externally.

Extractum Belladonnæ, D. L. E. ("Take of fresh belladonna leaves, collected when the plant begins to flower, any convenient quantity. Crush them in a mortar, express the juice, and allow it to stand for twenty-four hours. Pour off the clear liquor, and set it aside for subsequent use; and having placed the sediment on a calico filter, wash it with an equal bulk of distilled water, and mix the washings with the decanted liquor. When, by the application of a water heat, coagulation has occurred, skim of the coagulated matter, filter the hot liquid through flannel, mix in now the washed sediment, and evaporate to the consistence of a firm extract, by a steam or water-bath, constantly stirring, particularly towards the close of the evaporation," D. "Fresh belladonna leaves, ℔j.; bruise them in a stone mortar; then press out the juice, and evaporate it unstrained to a proper consistence," L. "Fresh belladonna, any quantity; bruise it in a marble mortar into an uniform pulp, express the juice; moisten the residuum with water and express again. Unite the expressed liquids, filter them, and evaporate the filtered liquid in the vapour-bath to the consistence of a firm extract, stirring constantly towards the close," E.) Dose, gr. ss. gradually increased to gr. iij. or. gr. iv. This is the preparation usually employed to dilate the pupil, for which purpose it is applied round the eye. In spasm of the urethra preventing the introduction of an instrument, the catheter has been smeared with extract of belladonna, but the benefit derived from its use is doubtful. It has been also applied to the os uteri in protracted labour caused by rigidity.

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* *Dublin Quarterly Journal of Medical Science*, New Series, vol. 2, p. 553, 1846.

Emplastrum Belladonnæ, D. L. E. ("Take of extract of belladonna, ℥j.; resin plaster, ℥ij.; melt the plaster by the heat of a steam or water-bath, then add the extract, and mix them intimately," D. "Extract of belladonna; soap plaster, of each, ℥iij.; to the plaster melted with the heat of a water-bath, add the extract, stirring constantly until a due consistence is acquired," L. "Resin plaster, ʒiij.; extract of belladonna, ℥iss.; melt the plaster with a gentle heat, add the extract, and mix them," E.) An excellent local application over the sacrum in dysmenorrhœa, and for the relief of neuralgic and other pains.

Tinctura foliorum Belladonnæ, D. *Tinctura Belladonnæ*, L, ("Belladonna leaves, dried, and in coarse powder, ℥v.; proof spirit, Oij; macerate for fourteen days, strain, express, and filter," D. "Belladonna, dried, ℥iv.; proof spirit, Oij.; macerate for seven days, express and strain," L.) Dose, min. iij. to min. viij.; fʒj. added to f℥iv. of water or of any liniment may be used as a lotion.

Unguentum Belladonnæ, L. (Extract of belladonna, ʒj.; lard, ℥iv.; rub together.) In painful hemorrhoidal affections, in chordee, in orchitis, and in neuralgia.

Succus Belladonnæ, (Prepared by expressing the fresh leaves collected in the beginning of July, setting aside the expressed juice for 48 hours, and adding to the clear decanted liquor a fifth part of rectified spirit.) Dose, min. xx. to min. xl. gradually increased.

Atropiæ Sulphas, L. (Dilute sulphuric acid, fʒij; atropia, ℈viiss., or a sufficiency; distilled water, f℥ss.; to the acid mixed with the water add gradually the atropia to saturation; filter the liquor, evaporate with a gentle heat and crystallize. This salt is intended for external use only.) To produce dilatation of the pupil, one or two drops of a solution of this salt in a fluid drachm of water may be introduced into the eye; or the following solutions may be used:—

Solution of Atropia, WILDE. (Atropia, gr. j.; dilute nitric acid, min. j.; rectified spirit, min. iij.; distilled water, fʒj.; mix.) A solution of this strength is labelled No. 1; Nos. 2 and 3 contain respectively two and three grains of atropia.

INCOMPATIBLES.—According to some recent observations of Dr. Garrod of London, it would appear that caustic potash and caustic soda when combined with belladonna or its preparations destroy their medicinal activity, but that such effect is not produced by the carbonates or bicarbonates of the alkalies. As regards the action of belladonna on the iris, however, this statement does not hold good.

In poisoning with belladonna or atropia, stimulating emetics followed by the use of liquor potassæ and then active cathartics should be employed; with cold applications to the head; and if coma be present, ammonia should be administered, and the usual external stimulants applied.

CANNABIS INDICA, D.—*Indian hemp; the extract.* According to the most recent observations, it would appear that the Indian hemp is precisely identical in botanical characters with the common hemp of this country, the *Cannabis sativa;* differing only in the secretion of a resin with which it abounds, and which is almost totally absent in the European variety. It grows in India, Persia and Africa ; and belongs to the Natural family *Urticaceæ (Cannabinaceæ,* Lindley), and to the Linnæan class and order *Diœcia Pentandria.*

BOTANICAL CHARACTERS.—Annual, about 3 feet high ; Stem branching, pubescent, angular; Leaves, alternate or opposite, digitate, scabrous, on long, weak petioles; leaflets, linear, lanceolate, sharply serrated ; Flowers, diœcious, in axillary clusters ; Achenium, ovate, one-seeded.

PREPARATION.—The dried plant and resin are both used, although the latter only is officinal in the Dublin Pharmacopœia ; the former is cut when the plant is in flower, and allowed to dry in the sun for three days, care being taken not to remove the resin ; it is called in India, *Gunjah*, *(Hachish* or *Hatschich*). In Nepaul, according to Captain Smith, the resin is " extracted from the shrub when the plant is in flower, and its seeds on the point of maturity, it being material to the purity of the extract that the leaf should not be parched or dry. The manipulations of the plant consist in rubbing the leaves gently between the hands, until these become sufficiently charged with the juice which adheres to the palms in the form of a dark, viscid, and tolerably consistent substance ; this being removed with a spatula or knife is made up into balls or lumps, which, while unrefined, are sold under the name of *Churrus* ; the clarified Churrus is called *Momes* from its resemblance to wax, and burns with the brightness of a resinous flame."* The following account of its preparation in Central India, as given by O'Shaughnessy, differs somewhat from the foregoing : " Men clad in leathern dresses run through the hemp fields, brushing through the plant with all possible violence ; the soft resin adheres to the leather, and is subsequenly scraped off, and kneaded into balls ; a finer kind is collected with the hand ; in some instances the leathern attire is dispensed with, and the resin is gathered on the skins of naked coolies." Purified by the following process it constitutes *Extractum Cannabis Indicæ Purificatum*, D.:—" Take of extract of Indian hemp of commerce, one ounce ; rectified spirit, four fluid ounces ; dissolve the extract in the spirit, and when the dregs have subsided, decant the clear liquid, and evaporate, by means of a water bath, to the consistence of a soft extract."

PHYSICAL PROPERTIES.—*Gunjah* is sold in bundles about two feet long, and three inches in diameter; it consists of the stems with the leaves and flowers accreted together by the resinous exudation ; is of a dusky green colour, and has an agreeable narcotic odour (as met with in this country, however, the odour is feeble), and a bitter taste resembling that of tobacco. *Churrus*—the officinal extract of the Dublin College—is a hard resin, of a blackish-grey colour, a fragrant narcotic odour, and a bitterish, acrid, slightly warm taste. The leaves and capsules without the stalks are sold in India under the name *Bang, Subjee,* or *Sidhee ;* they have been also imported into Britain, but their medical property is very feeble, they should not, therefore, be employed in the preparation of the extract or tincture.

CHEMICAL PROPERTIES.—The medical virtues of Indian hemp are due to the resin with which it is covered, and which has been named *cannabin ;* this principle appears to be a peculiar resin developed on the plant in warm climates only. The herb contains also a small quantity of volatile oil, which has not been as yet sufficiently examined. The dried resinous tops of the plant yield to alcohol about 20 per cent. of resinous extract, which is of a dark reddish-brown colour ; has a rather fragrant, narcotic odour, resembling that of *Canaster tobacco* ; and a bitter, somewhat acrid taste. This resin is nearly all soluble in rectified spirit and in ether. The *churrus* which has been brought from India has an odour and taste nearly similar to that of the well prepared extract.

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* A Narrative of Five Years Residence in Nepaul. By Thomas Smith, Assistant Political Resident at Nepaul, from 1841 to 1845. London : 1852, vol. 1, page 72.

ADULTERATIONS.—Several specimens of the extract of Indian hemp which I have met with, did not possess the peculiar odour or taste of the extract as prepared under my own direction ; whether this arose from faulty preparation, or the substitution of some other substance, I cannot say. The true extract is readily known by its peculiar odour and taste.

THERAPEUTICAL EFFECTS.—Although the Indian hemp has been used in Persia, throughout India, and in Africa, for many hundred years, under the name of *Hachish*, for producing inebriation, and also as a medicine ; it has only been of late years introduced into British medicine, through the exertions of Dr. O'Shaughnessy, of Calcutta. In its action on the system it is decidedly narcotic, producing at first the effects of a powerful stimulant, which, if the dose taken be sufficiently large, are soon followed by those of a direct sedative. With the object of obtaining relief in a severe neuralgic attack, I took a full dose of the ethereal tincture, a few years ago, for two nights in succession, with the most decided beneficial results; on each night, although I obtained almost immediate relief from pain, I was the subject of singular hallucinations which proved quite satisfactorily to myself the *duality of the brain.* The preparations of Indian hemp have been chiefly employed in the treatment of neuralgic and painful affections ; in most of which they have proved very beneficial. Thus, they have been given in tetanus, hydrophobia, infantile convulsions, sciatica, chorea, neuralgic pains, and chronic rheumatism ; they have been also used to subdue sleeplessness or disturbed rest, provided it does not arise from inflammation of the brain. I have derived excellent effects from the administration of the tincture of Indian hemp in the nervous depression and palpitation of persons addicted to the inordinate use of opium, in which cases other stimulants and narcotics possess little, if any effect. All who have tried the effects of this remedy in the British Isles, have come to the conclusion that the Indian hemp must be given in much larger doses in this country than in the East, and on his return home this was acknowledged by Dr. O'Shaughnessy himself. The trials made with it in the diseases above enumerated, would seem to show, that the Cannabis Indica may be often used with benefit as a substitute for opium, in cases for which that drug is unsuited from idiosyncrasy or any other cause ; and also that it does often succeed in abating, sometimes in completely removing pain, where this agent totally fails us. But the conclusion which an impartial observer must draw from the numerous cases in which Indian hemp was used as a remedy, which have been made public since the first edition of this book was published, is that it is an exceedingly uncertain medicine, producing the most manifest narcotic symptoms in some individuals, and in others the very same preparation appearing to be perfectly inert : and my own experience of its use fully justifies this conclusion ; yet this may to a certain extent depend on the bad preparations of it that were commonly sold—a defect which now that it has become an officinal drug in the Dublin Pharmacopœia will not be so likely to occur. In consequence of its stimulating properties, the use of Indian hemp is contraindicated in acute inflammatory diseases.

DOSE AND MODE OF ADMINISTRATION.—The officinal preparations of the drug are the purified extract, and a tincture ; the mode of purifying the extract has been given above ; the dose of it is gr. $\frac{2}{3}$, gradually increased to gr. iv. or gr. v , until a tendency to coma is produced, its effects being carefully watched ; gr. ss. to gr. iss. is the dose usually given in the East, and this quantity frequently produces marked symptoms. It is best given in the form of pill.

Tinctura Cannabis Indicæ, D. (Take of purified extract of Indian hemp, half an ounce; rectified spirit, half a pint: dissolve the extract in the spirit.) Each fʒj contains about two grains and 3-4ths of a grain of the extract. Dose, min. xx. to fʒj. frequently repeated until the desired effect is produced. This tincture is decomposed by water, the resin being precipitated in the form of a pale yellow powder. It should be therefore suspended in aqueous vehicles, by means of mucilage, syrup, or yolk of egg.

Tinctura Cannabis Indicæ, AUTHOR. (Purified extract of Indian hemp, gr. clx. ; sulphuric ether, Oss. ; dissolve.) I have found this preparation much more certain in its effects than the alcoholic tincture. The dose is from min. x. to min. xx., repeated at intervals of an hour until the effect desired is produced. It should be suspended in aqueous vehicles by means of mucilage.

HYOSCYAMUS, L. E. HYOSCYAMUS NIGER, FOLIA, D.—*Henbane. The leaves (the stem leaves, fresh and dried, of the biennial plant,)* L. *of Hyoscyamus niger.* An indigenous plant, belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Annual or biennial ; Stem, much branched, rounded ; Leaves, sub-ovate, amplexicaul, sinuate, ; Flowers, nearly sessile, dingy yellow with purplish veins ; Capsules, 2-celled, many-seeded, when the seeds are ripe the upper part falling off like a lid ; the whole plant is covered with unctuous fetid hairs.

PREPARATION.—The leaves of the biennial plant alone should be employed ; they are to be gathered when the plant is in full flower, and dried quickly at a temperature not above 120°. The London College directs the herb which grows in deposits of rubbish and wild by the wayside, to be preferred to that cultivated in gardens.

PHYSICAL PROPERTIES.—Hyoscyamus leaves, when carefully dried, are of a greenish-yellow colour, have a clammy feel, a fetid, narcotic odour, and a bitter nauseous taste; in the fresh state, the odour and taste are similar but more powerful, and the colour is dull green. The seeds which have been omitted from the last edition of the London Pharmacopœia are ovoid, compressed, rough, of a brownish-yellow colour; they have a feeble narcotic odour, and a bitter, somewhat acrid taste.

CHEMICAL PROPERTIES.—Hyoscyamus leaves contain a narcotic extractive soluble in water and alcohol, bitter extractive, gummy extractive, and salts of magnesia, (Lindbergson). M. Brandes announced the discovery of a vegetable alkaloid, which he named *hyoscyamia,* in the leaves and seeds of the Hyoscyamus niger, but his statements have not been confirmed by more recent experiments. Runge has, however, shown that this was owing to the employment of a caustic alkali to separate it; and by using magnesia for this purpose he has obtained vegetable alkalies from belladonna, henbane and stramonium, the three of which resemble each other so closely, that there is reason for believing they are identical. Geiger and Hesse have obtained the alkaloid from the seeds in tufts of transparent silky needles, rather sparingly soluble in water, but freely soluble in alcohol and ether. According to the analysis of Kirshoff, the seeds consist of 28·3 per cent. of volatile and narcotic matter, 15·6 per cent. of fixed oil with some resin, 2·3 per cent. of extractive, with sugar, gum, lignin, albumen, and some salts. The leaves and seeds of the henbane impart their virtues to water, alcohol, ether, and the fixed and volatile oils.

ADULTERATIONS.—The admixture of any other leaves with those of the Hyoscyamus niger may be readily detected by their physical properties, of which the following characters are given in the last edition of the London Pharmacopœia:—"Sessile, oblong, acutely sinuous, sub-pubescent with viscid, fetid hairs." The leaves lose much of their activity by keeping, they should therefore be gathered every year. When henbane is badly preserved, the odour and taste are very feeble.

THERAPEUTICAL EFFECTS.—When taken in large quantity, every part of this plant acts as a powerful narcotico-acrid poison, producing delirium, followed by sopor with marked dilatation of the pupil, which, if active treatment be not immediately employed, is the precursor of death. In medicinal doses, its operation is narcotic; but it is distinguished from most other medicines of this class by several peculiarities. Thus, the preliminary or stimulant stage of its operation, even when taken in small doses frequently repeated, is very slight, often not at all discernible; and in the second stage of its operation, it causes sleep, rather by lessening excitability and allaying pain, than by any direct action on the nervous system; under its continued use, the bowels also are gently acted on, and do not become constipated, as occurs when opium is taken. In consequence of these properties, hyoscyamus is employed with much advantage in many painful diseases in which from any circumstance the use of opium is objectionable. It is especially found beneficial in sleeplessness, or irritability, when the symptoms of pyrexia, as hot skin, thirst, delirium, &c., are present; in all forms of neuralgia and spasmodic affections where there is great excitability of the nervous system, and in which the stimulating effects of opium would prove injurious; in irritation of the bronchial mucous membrane causing cough; and in diseases of the urinary organs. There are, however, many persons in whom hyoscyamus produces great excitement, headache, and even delirium; and in such its use should be carefully avoided. Given in combination with active cathartics, it corrects their griping qualities without diminishing their activity. Externally, fomentations or cataplasms of hyoscyamus are employed to diminish pain in glandular enlargements, painful ulcerations, hemorrhoidal affections, &c. The best preparation for this purpose is the oil of hyoscyamus of the Parisian Codex, the formula for preparing which, will be found below.

DOSE AND MODE OF ADMINISTRATION.—In powder the leaves may be given in doses of from gr. v. to gr. x.; or the seeds in doses of gr. iij. to gr. viij.; the following preparations, however, are generally employed:—

Extractum Hyoscyami, D. L. E. ("Take of fresh hyoscyamus leaves, collected when the plant begins to flower, any convenient quantity: the method of preparation is the same as for *Extractum Belladonnæ*," D. "Prepared in the same manner as the similar preparation of belladonna," L. "To be prepared by any of the processes directed for extract of conium," E.) The continued evaporation by heat to which this extract is subjected, when prepared according to the formulæ of the Dublin and London Colleges, impairs its activity; prepared according to the Edinburgh Pharmacopœia it is much more powerful. Dose, gr. v. to gr. xv., given in the form of pill.

Tinctura Hyoscyami, D. L. E. ("Henbane leaves, dried and in coarse powder, ℥v.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Hyoscyamus, dried, ℥v.; proof spirit, Oij.; macerate for 7 days, express and filter," L. "Hyoscyamus, dried and in moderately fine powder, ℥v.; proof spirit, Oij.; this tincture is best prepared by the process of percolation, as directed for tincture of capsicum; but it may also be obtained, though with greater loss, by the process of digestion," E.) Dose, f℥ss. to f℥ij.

Succus Hyoscyami. (Fresh hyoscyamus leaves, any quantity; express the juice with a powerful press, set aside for 48 hours, pour off the clear supernatant liquor, and add to it a fifth part of rectified spirit.) This is the best preparation of henbane. Dose, min. xx. to min. xl.

Oleum Hyoscyami, PARIS CODEX. (Fresh hyoscyamus leaves, 500 parts; olive oil, 1000 parts; bruise the hyoscyamus, mix with it the oil, and heat over a very gentle fire until all the water is evaporated; then digest for two hours, and strain with expression.) Used as an external application only.

INCOMPATIBLES.—The vegetable acids; nitrate of silver; acetate of lead; and according to the experiments of Dr. Garrod (see page 284) potash and soda, but not their carbonates or bicarbonates.

In poisoning with hyoscyamus, stimulating emetics and the stomach pump should be immediately employed, to be followed by external and internal stimulants, and afterwards blood-letting. Several cases of poisoning with henbane have been published in the Italian journals, in which lemon-juice in large quantity is stated to have proved a complete antidote.

LACTUCARIUM, D. E. LACTUCA, L. LACTUCA SATIVA, FOLIA, D. LACTUCA VIROSA, FOLIA, D.—*Lactucarium. Lettuce-opium. The inspissated juice of Lactuca sativa, and Lactuca virosa,* D. E. *The flowering herb of Lactuca sativa,* L. *The leaves of Lactuca sativa, and Lactuca virosa,* D. Both these species of Lactuca belong to the Natural family *Compositæ (Asteraceæ,* Lindley), and to the Linnæan class and order *Syngenesia Æqualis.* The former, though extensively cultivated in the British Isles, was originally introduced probably from the East; the latter is indigenous. Lactucarium may be also obtained from the *Lactuca scariola* and *Lactuca sylvestris,* and according to Aubergier the best is procured from the *Lactuca altissima.*

BOTANICAL CHARACTERS.—*Lactuca sativa* is an annual; Stem, erect, smooth, cylindrical, branching above, 1–2 feet high; Leaves, rounded, or ovate, more or less wrinkled, generally sheathing at the base, of a pale green colour; Flowers, pale-yellow, small, in terminal corymbs.—*Lactuca virosa* is a biennial; Stem, erect, prickly, 3–4 feet high; Leaves, distant, patent, oblong, toothed, two-eared and amplexicaul at the base, their keel prickly; Flowers, small, yellow, in panicles.

PREPARATION.—As soon as the flowering stem of either of these plants shoots up, it abounds in a white milky juice, which did not before exist; this juice, when dried spontaneously, constitutes *lactucarium* or *lettuce-opium.* It is obtained by slicing off the flowering head before the flowers expand, collecting the milky juice which exudes, and removing a fresh slice of the stem as long as it yields any white juice. It has been omitted from the last edition of the London Pharmacopœia, while the extract of the Lactuca sativa, which possesses little, if any, medicinal properties, has been retained. The recent investigations of Mr. Duncan, of Edinburgh, have shown that the Lactuca virosa yields three times as much lactucarium as the garden lettuce, and that its quality also is superior. The milky juice exists in the leaves as well as in the flowering stem of the wild but not of the garden lettuce; I therefore do not know on what grounds the latter have been introduced into the list of Materia Medica of the last Dublin Pharmacopœia, while the stem is excluded.

PHYSICAL PROPERTIES.—Lactucarium is met with in large, roundish, rough masses, of an umber-brown colour; it has a narcotic odour, which though much fainter closely resembles that of opium, and a disagreeable, bitter taste.

CHEMICAL PROPERTIES.—Lactucarium consists of a peculiar neutral bitter crystalline principle *(Lactucin),* mannite, asparagine, a crystallizable matter which colours the persalts of iron green, an electro-negative resin combined with potash, a simple resin, wax, myricine, ulmic acid, pectin, albumen, numerous salts, (Aubergier.) Of these the *Lactucin* is the active principle; it appears to be to lactucarium what morphia is to opium ; is slightly soluble in cold but more so in boiling water, is also soluble in alcohol, but is insoluble in ether; it is a crystallizable, resinoid, bitter substance. By heat lactucarium softens, and is partially fused ; it is inflammable, and burns with a white flame. It yields its virtues partially to cold or boiling water, but more completely to alcohol.

THERAPEUTICAL EFFECTS.—Lactucarium, in its operation on the system, resembles opium in many respects, but it produces scarcely any excitement, consequently it may be employed as a substitute for that drug in cases in which a stimulant action is objectionable. It is, however, uncertain in its operation, and in many persons even when given in very large doses does not produce any effect. Lactucarium has been principally employed as an anodyne in phthisis, but when its use has been continued for even a comparatively short period, I have found it to lose its powers of producing rest, although the quantity given was much increased. Lactucarium has been also employed as a narcotic in febrile and inflammatory affections, in rheumatism, in arthritis, and in nervous disorders, where opium is contra-indicated from any cause.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. in the form of pill.

Tinctura Lactucarii, E. (Lactucarium in fine powder, ℥ij. ; proof spirit, Oj. ; this tincture is best made by percolation as directed for tincture of myrrh; but may also be prepared by digestion with coarse powder of lactucarium.) Dose, fʒj to fʒij. Every fluid drachm of this tincture contains gr. vj. of lactucarium.

Trochisci Lactucarii, E. (To be prepared with lactucarium, in the same proportion, and in the same way as opium lozenges.) Dose, ℈j to ℈ij. daily. Each lozenge of ten grains contains nearly one-seventh of a grain of lactucarium.

Extractum Lactucæ, L. (Fresh lettuce leaves, ℔j. ; bruise them in a stone mortar ; then press out the juice, and evaporate it unstrained to a proper consistence.) A bad preparation, sometimes substituted for lactucarium ; and from which it may be known by its greater compactness, and very feeble odour. Dose, ℈j. to ʒj.

LUPULINA, D.—*Lupulin ; the yellow powder separated from the strobiles of Humulus lupulus by rubbing and sifting.*

LUPULUS, L. E. HUMULUS LUPULUS, STROBILI SICCATI, D.—*Hops. The dried Strobiles (Catkins*, L. E.) *of Humulus lupulus.* Scarcely indigenous, probably introduced from Holland ; it belongs to the Natural family *Urticaceæ (Cannabinaceæ*, Lindley), and to the Linnæan class and order *Diœcia Pentandria.*

BOTANICAL CHARACTERS.—Stems, long, weak, and climbing, scabrous ; Leaves, petiolate, 3-5 lobed, serrated, veiny, rough ; Flowers, greenish-yellow.

PREPARATION. The aggregated fruits, *catkins* or *strobiles*, when preserved, constitute the hops of commerce ; they are gathered in September, picked, and dried in kilns.

PHYSICAL PROPERTIES.—Hops occur in the form of thin, papery, greenish-yellow scales, variously veined, and sprinkled with a golden-yellow powder; they have a peculiar aromatic odour, and an aromatic, very bitter taste, which are altogether due to this powder, which has been termed *Lupulin*, *Lupuline*, and *Lupulite;* if it be carefully removed the scales have no longer either odour or taste.

CHEMICAL PROPERTIES.—The medical efficacy of hops is due to the *lupulin;* it constitutes about a sixth part of good hops, and may be readily obtained in a separate state by rubbing and sifting, as directed by the Dublin College. The scales are composed of astringent matter, inert colouring matter, chlorophylle, gum, lignin, and salts of potash and lime, with some adhering *lupulin*, (Payen and Chevallier.) Lupulin is in the form of a coarse greenish-yellow powder, of a cellular texture; it consists of 2 per cent of volatile oil, 10·3 of bitter principle *(lupulite)*, 50 to 55 of resin, 32 of lignin, &c. According to the recent chemical investigations of M. Personne it appears that the volatile oil of Lupulin is homologous with oil of valerian, from which he argues an analogy between the therapeutical action of valerian and of hops. Hops and lupulin yield their active properties to both water and alcohol.

THERAPEUTICAL EFFECTS.—Much difference of opinion exists as to the therapeutical properties of hops; they are generally stated to be narcotic, but from the experiments made with them on animals, by Magendie and others, it would appear that this effect is not manifested when they are given internally, no matter how large the dose. Nevertheless, the inhalation of the aroma of hops acts decidedly narcotic, frequently producing sleep in the restlessness and watchfulness of mania and other nervous affections, when opium and other narcotics have completely failed: to produce this effect, a pillow stuffed with hops is generally employed. Lupulin has been more employed in the United States than in this country; and amongst the American physicians it bears the character of being a useful narcotic; Dr. Page, of Philadelphia, states, that he has found it of especial value in chordee, and his statement has been corroborated by some recent French writers, who also speak very highly of its powers in checking nocturnal seminal emissions. The solution of the bitter principle of the hop in malt liquors serves to make them keep better, and also confers on them aromatic and tonic properties.

DOSE AND MODE OF ADMINISTRATION.—*Lupulin*, gr. vj. to gr. xij. in powder or pill; if the hop possesses any narcotic property, it must be concentrated in this substance.

Extractum Lupuli, L. E. ("Prepared as the extract of Logwood," E. "Hops, ℔iiss.; boiling distilled water, cong. ij.; macerate for 24 hours: then boil down to a gallon, and strain the liquor while yet hot; lastly, evaporate to a proper consistence," L.) Dose gr. v. to gr. xx.

Infusum Lupuli, L. (Hops, ℥vj.; boiling distilled water, Oj.; macerate for 4 hours in a covered vessel, and strain.) A mild bitter, very feebly, if at all narcotic. Dose, f℥j. to f℥ij.

Tinctura Lupulinæ, D. *Tinctura Lupuli*, L. E. ("Take of lupulin, ℥v.; rectified spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Hops, ℥vj.; proof spirit, Oij.; macerate for 7 days, express, and strain," L. "Take any convenient quantity of hops recently dried, separate by friction and sifting the yellowish-brown powder attached to their scales; then take, of this powder, ℥j.; and of rectified spirit, f℥viij.; and prepare the tincture by percolation or digestion as directed for tincture of Capsicum," E.) This tincture, as prepared according to the directions of the Dublin and Edinburgh pharmacopœias, is intensely bitter and but slightly aromatic. Dose, ʒss. to fʒij.

INCOMPATIBLES.—Mineral acids; and the salts of iron, lead, mercury, and silver.

MORPHIA, D.—*Morphia. A peculiar principle on which the medicinal activity of opium chiefly depends.*

PREPARATION.—"Take of Turkey opium, cut into thin slices, ℔j.; distilled water, Ovj.; chloride of calcium, ʒvj.; prepared animal charcoal, as much as is sufficient. Macerate the opium for twenty-four hours with a quart of the water, and decant. Macerate the residuum for twelve hours with a second quart of the water, decant, and repeat this process with the rest of the water, subjecting the insoluble residuum to strong expression. Let the decanted solutions and expressed liquor be evaporated by a steam or water heat to the bulk of one pint, and then passed through a calico filter. Pour in now the chloride of calcium, first dissolved in four ounces of distilled water, and then proceed with the evaporation until the solution is so far concentrated that upon cooling nearly the whole of it becomes solid. Let this solid matter be enveloped in a couple of folds of strong calico, and subjected to powerful pressure, the dark liquid which exudes being reserved for subsequent use. The squeezed cake is now to be acted upon with about half-a pint of boiling water, and the whole being thrown upon a paper filter, the precipitate must be well washed. The filtered solution having been evaporated as before, cooled and solidified, the residue is to be again subjected to expression. If the product be not quite white, this process should be repeated a third time, the liquid forced out during expression being always preserved. Let the squeezed cake be dissolved in six ounces of boiling water, and, if necessary, cleared by filtration through prepared animal charcoal, the portion of it soaked by the filter being carefully washed out of it; and to the solution thus obtained let water of ammonia be added in slight excess, and let the crystalline precipitate which forms when the liquor has cooled be collected on a paper filter, and washed with cold distilled water until the washings cease to give a precipitate upon being dropped into an acid solution of nitrate of silver. Lastly, let the filter be transferred to a porous brick, in order that the morphia it contains may become dry. The liquids separated by expression from the muriate of morphia, in the preceding process, having been diluted with water, so as to occupy the bulk of four ounces, and then supersaturated slightly with ammonia, let the precipitate which forms be collected, after the lapse of six hours, on a filter, and washed with a little cold water. This, if redissolved in dilute muriatic acid, boiled with a little animal charcoal, and filtered, will, upon cooling, afford a crystalline deposit, from which, when pressed, dissolved in water, and supersaturated with ammonia, an additional quantity of morphia will be procured." Morphia has been omitted from last edition of the London Pharmacopœia.

PHYSICAL PROPERTIES.—Thus obtained, morphia is in the form of a white crystalline powder, the crystals being very minute, hard and brilliant; but by solution in boiling alcohol and slow evaporation, they may be obtained much larger; their primary form being right rhombic prisms. They are inodorous but have a sensibly bitter taste.

CHEMICAL PROPERTIES.—Morphia in the crystalline state consists of $C^{35} H^{20} O^{6} N + 2HO$; but the proportions of carbon and hydrogen have been variously stated by different chemists. It is permanent in the air, fusible by heat, but by a high temperature is decomposed; is inflammable, burning with a bright flame and a peculiar odour, and leaving a carbonaceous residuum. Morphia requires 100 parts of water to dissolve it, the solution possessing an alkaline reaction; is insoluble in ether, but dissolves in 40 times its weight of cold and in 30 times its weight of boiling alcohol; is very soluble in solution of caustic potash, soda, or lime water, and but feebly so in ammonia. The best characteristic of morphia and its salts is the property which they possess of striking a deep blue colour with the solution of a persalt of iron made as nearly neutral as possible; it also gives a red colour with nitric acid, and a brownish-red with iodic acid.

THERAPEUTICAL EFFECTS.—On account of its insolubility morphia is not used in medicine; its therapeutical effects, therefore, will be more conveniently considered when treating of the muriate of morphia, the most frequently employed of its salts. The dose of the pure alkaloid would be from one-fourth to one-half of a grain in the form of pill.

MORPHIÆ ACETAS, D. L. E.—*Acetate of Morphia. A crystalline salt prepared from opium*, L.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin.*—" Take of morphia, in fine powder, ℥j.; rectified spirit, f℥viij.; acetic acid of commerce (specific gravity, 1044), fʒivss. or as much as is sufficient. Pour the spirit on the morphia, and, applying heat, gradually add the acetic acid until a neutral, or slightly acid solution is obtained. Let this be evaporated to the consistence of syrup by a steam or water heat, and then set by for a few days until it solidifies. In operations on the great scale it will be worth while to remove the spirit by distillation." *Edinburgh.*—" Muriate of morphia, any convenient quantity. Dissolve it in 14 times its weight of warm water; and when the solution is cool, add aqua ammoniæ gradually, and with constant agitation, until there is a permanent but faint odour of ammonia in the fluid. Collect the precipitate on a calico filter, wash it moderately with cold water, and dissolve it by means of a slight excess of pyroligneous acid in 12 parts of warm water for every part of muriate of morphia that was used. Concentrate the solution over the vapour-bath and set it aside to crystallize. Drain and squeeze the crystals, and dry them with a gentle heat. More acetate of morphia may be obtained on concentrating the mother-liquor."

PHYSICAL PROPERTIES.—As usually met with, acetate of morphia is a grayish-white powder, sometimes obscurely crystalline; when pure, however, it is snow-white and in distinct crystals. It is inodorous, but when moistened emits a feeble odour of acetic acid; its taste is intensely bitter.

CHEMICAL PROPERTIES.—It is composed of one equivalent of acetic acid and one of morphia. Exposed to the air it loses a portion of its acid, and is then partially insoluble in water; it is decomposed by heat, and dissipated without any residuum. Acetate of morphia is very soluble in water and in alcohol. When the base is not completely saturated with acid, its solution in water may be readily accomplished by adding a few drops of acetic acid.

ADULTERATIONS.—When the salt is properly prepared, it is of a snow-white colour, and readily soluble in water. The following test of the Edinburgh Pharmacopœia, which indicates the exact quantity of morphia that ought be present, guards against the adulteration with any other white powder :—" One hundred measures of a solution of gr. x. in f℥ss. of water and min. v. of acetic acid, heated near to 212°, and decomposed by a faint excess of ammonia, yield by agitation a precipitate which in 24 hours occupies 15·5 measures of the liquid." The characteristics and tests for acetate of morphia given in the last edition of the London Pharmacopœia are as follows :—" Soluble in water and rectified spirit ; by distilling off the spirit it will be obtained in crystals which are dissipated by heat ; on the addition of nitric acid it first becomes red, then yellow; tincture of sesqui-chloride of iron imparts to it a blue colour : on the addition to it first of recently prepared chlorine and then of ammonia, a brown colour is produced which disappears on more chlorine being added : morphia is precipitated by solution of potash, which if added in excess redissolves the precipitate."

THERAPEUTICAL EFFECTS.—The uses of this preparation are precisely similar to those of the muriate to be next described ; the latter salt should be in general preferred, as it is more easily prepared, keeps better, and is usually more pure.

DOSE AND MODE OF ADMINISTRATION.—Gr. $\frac{1}{4}$th to gr. ss. in pill, or in solution as follows :—

Morphiæ acetatis liquor, D. L. (" Take of acetate of morphia, gr. lxxxij. ; rectified spirit, f℥v. ; distilled water, f℥xv. Having added the spirit to the water, dissolve the acetate of morphia in the mixture, and, if the solution is not quite clear, pass it through a paper filter," D. " Acetate of morphia, ʒiv. ; acetic acid, min. xv. ; distilled water, Oj. ; proof spirit, Oss. ; mix and dissolve," L.) The acetic acid is added in the London Pharmacopœia to render the solution more complete. The strength of the Dublin preparation is intended to be equivalent to tincture of opium ; f℥j. contains $4\frac{4}{10}$th grains of acetate of morphia ; fʒj. containing a little more than gr. ss. Dose, min. xx. to min. xl. That of London is double this strength ; each fʒj. containing gr. j. of acetate of morphia : its dose therefore is from min. x. to min xx. (See, *Morphiæ Murias.*)

Syrupus Morphiæ Acetatis, D. (Take of solution of acetate of morphia, one fluid ounce ; simple syrup, fifteen fluid ounces. Mix with agitation.) A useless preparation. f℥j. contains a little more than a fourth of a grain of the acetate.

INCOMPATIBLES.—The stronger acids ; the alkalies, and alkaline earths ; most earthy and metallic salts ; and astringent vegetable infusions and decoctions.

MORPHIÆ MURIAS, D.E. MORPHIÆ HYDROCHLORAS, L.—*Muriate of Morphia. Hydrochlorate of Morphia. A crystalline salt prepared from opium,* L.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin.*—"Take of morphia, in fine powder, one ounce; pure muriatic acid, four fluid drachms and a-half, or a sufficient quantity; distilled water, two ounces and a-half. Mix the acid with the water, heat to about 200°, and add the morphia, constantly stirring, so that a solution may be formed having a slightly acid reaction. Set this to cool for twelve hours, and let the crystals which separate be drained off the liquor which surrounds them, and dried on blotting-paper. The decanted liquor will, by further concentration and cooling, give additional crystals." *Edinburgh.*—"Take of opium ℥xx.; water, Oviij.; muriate of lime, ℥j., or a slight excess; macerate the opium in fragments for 24 hours in Oij. of the water; and separate the infusion, squeezing well the residue. Repeat the maceration successively with Oij. more of the water, till the whole is made use of. Concentrate the whole infusions over the vapour-bath. Decant the clear liquid, and add the muriate of lime dissolved in f℥iv. of water. Set the whole aside to settle; pour off the liquid; wash the sediment with a little water, adding the washings to the liquid. Evaporate the liquid sufficiently in the vapour-bath for it to solidify on cooling. Subject the cooled mass to very strong pressure in a cloth; redissolve the cake in a sufficiency of warm distilled water; add a little fine powder of marble, and filter; acidulate the filtered fluid with a very little muriatic acid; and concentrate a second time in the vapour-bath for crystallization. Subject the crystals again to a very strong pressure in a cloth. Repeat the process of solution, clarification by marble and muriatic acid, concentration and crystallization, until a snow-white mass be obtained. On the small scale trouble and loss are saved by decolorizing the solution of muriate of morphia by means of a little purified animal charcoal after two crystallizations. But on the large scale it is better to purify the salt by repeated crystallizations alone, and to treat all the expressed fluids, except the first, in the same way with the original solution of impure muriate of morphia. An additional quantity of salt may often be got from the first dark and resinous fluid obtained by expression, on merely allowing it to remain at rest for a few months, when a little muriate of morphia may be deposited in an impure condition. The opium which yields the largest precipitate by carbonate of soda, according to the formula for testing opium, will yield muriate of morphia, not only in the greatest proportion, but likewise with the fewest crystallizations." One pound of good opium yields one ounce and a-half of muriate of morphia (Gregory.)

PHYSICAL PROPERTIES.—Muriate of morphia is usually met with in the form of a fine, soft, snow-white powder, but it may be readily obtained in feathery, acicular crystals. It is without odour, but has an intensely bitter, peculiar taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of morphia, one of hydrochloric acid, and (in the crystalline state) six of water of crystallization. It is permanent in the air, is fusible by heat, and by a red heat is decomposed and totally dissipated. Muriate of morphia requires for its solution from 14 to 20 parts of cold water, but is soluble in less than its own weight of boiling water; it is also readily dissolved by alcohol.

ADULTERATIONS.—The chief impurities which are at present commonly met with in this salt are colouring matter and moisture, both of which arise from faulty preparation; recently, however, muriate of morphia has been adulterated with so much as 25 per cent. of white sugar, a serious fraud in so active and so important a medicine. The tests of the Edinburgh Pharmacopœia guard against these contaminations, as well as against the adulteration with any similar white powder.—"Snow-white; entirely soluble; solution colourless; loss of weight at 212° not above 13 per cent.; one hundred measures of a solution of gr. x. in f℥ss. of water, heated near to 212°, and decomposed with agitation by a faint excess of ammonia, yield a precipitate which in 24 hours occupies 12·5 measures of the liquid." The following are the characteristics and tests for this salt given in the last edition of the London Pharmacopœia:—"Soluble in rectified spirit and in water; what is precipitated from the solution in water by nitrate of silver is not entirely dissolved by ammonia unless added in excess, nor by nitric nor hydrochloric acid; it agrees in all other respects with acetate of morphia."

THERAPEUTICAL EFFECTS.—Notwithstanding the observations of many, that morphia is free from the stimulating effects of opium, and that it acts purely as an anodyne sedative, it would appear that it possesses essentially, though perhaps not quite identically, the actions of the drug itself, (see, *Opium.*) Thus, given in small doses, its first effect is to cause a feeling of excitement of the circulation, and, in some persons, of the nervous system also; the stage of excitement, however, is never so distinctly marked as when opium has been taken, and sedative effects are more immediately consequent on it. Morphia and its salts will, in some persons, but not in so many individuals, produce the disagreeable subsequent feelings of nausea and head-ache caused by opium; but constipation, sweating, or dryness of the tongue, very rarely follows their employment. There are two effects occasionally produced by morphia and its salts, when taken in medicinal doses, evidently dependent on idiosyncracy, which are not caused by opium, namely, a peculiar sensation of itchiness over the whole surface of the body, in some cases attended even with a cutaneous eruption; and irritability of the bladder, accompanied by a difficulty in voiding urine; the latter symptom is most distinctly marked when any of the salts of morphia have been taken in full doses. The salts of morphia may be employed in most instances to fulfil the same intentions as opium and its preparations, which will be fully considered when treating of that drug. We prefer their use to that of opium, where the drug itself is apt to disagree, when from any cause we wish to employ it without the knowledge of our patient, or where our intentions will be best answered by applying the remedy to the denuded dermis, as in certain local affections, especially those of a nervous character. The insertion of a few drops of a concentrated solution of muriate of morphia in creasote or in water, into the areolar tissue over the seat of the pain, has been practised with much success in the treatment of sciatica, tic douloureux, and various neuralgic pains; an instrument for the purpose has been invented by Mr. Rynd of this city, and is manufactured by Messrs. Weiss of London, but it may be performed nearly as effectually by means of a common lancet. Like opium, the salts of morphia lose their effect by repetition, and consequently the dose must be gradually increased.

DOSE AND MODE OF ADMINISTRATION.—The dose of the muriate of morphia is from gr. ¼th to gr. ss.; after it or the acetate has been employed for any length of time, so large a dose as gr. viij. to gr. x. will be required to act as a narcotic. When applied endermically, the cuticle is to be removed by means of a blister, and gr. j. to gr. ij. sprinkled over the denuded dermis. The salts of morphia can be also introduced into the system by inoculation with a lancet dipped in their aqueous solution; the punctures may be made on the anterior part of the fore-arm, and half a grain thus inserted will generally be found to produce sleep.

Morphiæ Muriatis liquor, D. *Morphiæ Hydrochloratis liquor*, L. *Morphiæ Muriatis solutio*, E. ("Muriate of morphia, gr. xc.; rectified spirit, f℥v.; distilled water, f℥xv.; mix the spirit and water, dissolve the muriate of morphia in the mixture, and unless the solution be quite clear, pass it through a paper filter," D. "Hydrochlorate of morphia, ʒiv.; distilled water, Oj.; proof spirit, Oss.; mix and dissolve," L. "Muriate of morphia, ʒiss.; rectified spirit, f℥v.; distilled water, f℥xv.; mix the spirit and the water, and dissolve the muriate of morphia in the mixture, with the aid of a gentle heat," E.) The strength of the Dublin and Edinburgh preparations is intended to be equivalent to tincture of opium, f℥j. containing gr. ivss. of muriate of morphia. Dose, min. xx. to min. xl. The London solution is nearly twice the strength, f℥j. containing gr. viij. of the hydrochlorate; the dose is therefore about one-half that of the preparation of either of the other Colleges.

Syrupus Morphiæ Muriatis, D. (Take of solution of muriate of morphia, one fluid ounce; simple syrup, seventeen fluid ounces. Mix with agitation.) A useless preparation; there seems also to be some mistake in the proportions, for while the officinal solution of acetate of morphia is supposed to be of the same strength as that of the muriate, the syrup of the latter is more diluted. Each fluid ounce contains a fourth of a grain of the muriate of morphia.

Trochisci Morphiæ, E. (Muriate of morphia, ℈j.; tincture of tolu, f℥ss.; pure sugar, ℥xxv.; dissolve the muriate of morphia in a little hot water, mix it and the tincture of tolu with the sugar, and with a sufficiency of mucilage form a proper mass for making lozenges, each of which should weigh about fifteen grains.) Each lozenge contains a little more than a fortieth of a grain of muriate of morphia. Principally used to allay tickling cough in chronic pectoral affections. Dose, N° x. to xij. daily.

Trochisci Morphiæ et Ipecacuanhæ, E. (Muriate of morphia, ℈j.; ipecacuan, in fine powder, ʒj.; tincture of tolu, f℥ss.; pure sugar, ℥xxv.: proceed as for *morphia lozenges*.) Dose and uses the same. In addition to the morphia, each lozenge contains about a fourteenth of a grain of ipecacuanha.

INCOMPATIBLES.—Alkalies, and alkaline earths; most earthy and metallic salts; and astringent vegetable infusions and decoctions.

MORPHIÆ SULPHAS.—*Sulphate of Morphia.* This salt of morphia is not often used in medicine in this country, but it bears a high character in America, and is officinal in the Pharmacopœia of the United States. It may be readily prepared by mixing morphia in powder with distilled water, and carefully adding diluted sulphuric acid till the morphia is saturated and dissolved. It occurs in snow-white feathery crystals which are completely soluble in water. It is composed of 1 equivalent of morphia, 1 of sulphuric acid, and 6 of water of crystallization. The dose is the same as that of the muriate, over which it does not appear to possess any advantage.

OPIUM, D. L. E.—*Opium. Turkey opium*, L. *Concrete juice obtained from the unripe capsules of Papaver somniferum.* Probably originally a native of Asia, Egypt, and the South of Europe, but now growing wild, and extensively cultivated in most parts of the world; it belongs to the Natural family *Papaveraceæ*, and to the Linnæan class and order *Polyandria Monogynia.*

BOTANICAL CHARACTERS.—Annual; Stem, erect, cylindrical, branched, glaucous-green, 2–6 feet high; Leaves, amplexicaul, alternate, undulated, incised, ovato-oblong, glaucous beneath; Flowers, large, terminal, pendulous before expansion, with two deciduous sepals, and four petals, generally white with a purple eye, some varieties red or dark-purple; Capsules, obovate or globose, smooth, many-seeded; Seeds, small, roundish or reniform, oily.

PREPARATION.—Opium is obtained from the capsules of the poppy by a nearly similar process in all parts of the world in which it is prepared:—A few days after the petals fall off, incisions are made horizontally and obliquely with some sharp instrument, through the epicarp and sarcocarp of the capsule, taking care not to penetrate the cavity. In India the incisions are made *perpendicularly*, in the form of a series of parallel wounds, in the exterior surface of the capsule, with an instrument called a *nushtur*, which consists of four or five heart-shaped lancets or blades, tied together with cotton thread. A white milky juice exudes from the incisions in drops; and this is allowed to remain on the poppy head for 24 hours. The thickened exudation is then scraped off, and deposited in earthern or wooden vessels, in which it is assiduously stirred until the different collections made are thoroughly inspissated, water or saliva being sometimes added to keep up the moisture. The opium is finally dried without heat, usually by exposure to the sun, first in small cakes, afterwards in large masses, and in most places wrapped in poppy leaves to prevent them from adhering.

PHYSICAL PROPERTIES.—The opium met with most commonly, at present almost entirely, in British commerce, is called TURKEY OPIUM, and is brought principally from Smyrna, a small quantity occasionally coming direct from Constantinople. SMYRNA OPIUM occurs in irregularly rounded lumps, varying in weight from a few ounces to two or even three pounds, the most general size being from a pound and a-half to two pounds. When first imported it is usually so soft as to be readily imprinted with the fingers, but it quickly becomes hard by keeping. Each lump is covered externally with the reddish winged seeds of some species of *Rumex*, and the inferior sorts usually with poppy leaves also; it is of a brownish colour, and has a waxy lustre when cut; its odour is strong and narcotic, and its taste bitter, acrid, and nauseous. CONSTANTINOPLE OPIUM—rarely met with—occurs in small flattened cakes covered with a poppy leaf, but without any *Rumex* seeds. It is hard, and of a hair-brown colour; its odour and taste are more feeble than the preceding sort. EGYPTIAN OPIUM also sometimes occurs in the British market, but for some years it has been very scarce, in consequence of the demand being slight, owing to its inferior quality. It is in flattened round cakes, from 3 to 8 ounces in weight, each cake being wrapped up in a poppy leaf, with the midrib of which it is indented; it varies much in consistency, some pieces being very soft and others tolerably hard; but most of them attract moisture from the air so as to become soft by keeping. It has a reddish-brown colour; its odour and taste are comparatively feeble. EAST INDIAN OPIUM is not an article of British commerce, being manufactured chiefly for the Chinese market. For specimens of the different sorts usually prepared, I am indebted to the kindness of Professor Christison of Edinburgh, and to Mr. Johnson, formerly assistant opium inspector at the great factory of Behar. Three kinds are commonly met with; BENGAL OPIUM, which includes that prepared at the factories of Behar and Benares, GARDEN PATNA and MALWAH OPIUM. *Bengal Opium* occurs in large round balls from three to four pounds weight, surrounded with a thick envelope of poppy petals firmly agglutinated together. The contained opium is quite soft and of a blackish colour; the odour and taste are purely opiate; it is prepared in large quantity for the Chinese market, and is usually of very fine quality. *Garden Patna Opium* is in flat square cakes from three to four inches square, and about half an inch thick; while still soft, it is closely enveloped in thin plates of mica, which firmly adhere to it. It has a reddish-brown colour, homogeneous throughout, and a rather agreeable strongly opiate odour. *Malwah Opium* is in flattened round cakes, five or six inches in diameter; it is hard and brittle, covered externally with a coarse greyish dust, internally it is of a light-brown colour, and has a shining fracture; its odour is much more feeble than that of Garden Patna Opium. Opium was also formerly prepared in England of very fine quality, but owing to the losses which were sustained from the uncertainty of our climate, the cultivation of the poppy with that intention is now quite abandoned. It is at present prepared in some parts of France, and of Germany, for the purpose of procuring morphia from it. A variety of opium, under the name of *Persian Opium*, is described as having been imported some years since from Trebizond on the Black Sea; it was in cylindrical sticks about six inches long, and half an inch in diameter, wrapped separately in paper; it was of a pale brown colour, had an opiate, somewhat musty odour, and an intensely bitter taste; it appeared to be a very inferior article. Opium has also been recently imported into France from the neighbourhood of Algiers; it is described as resembling closely the best specimens of Smyrna opium; and the cultivation of the poppy there for the purpose of supplying France with opium is being gradually brought into full operation. Of the different varieties of opium above described, the finer qualities of Turkey opium are to be preferred for medical purposes.

CHEMICAL PROPERTIES.—According to the most recent, as well as the most complete, analyses that have been made of opium, the substances of which it is composed appear to be the following :—*Morphia, codeia, narcotina, thebaina or paramorphia, narcein, meconin, porphyroxin or opine, meconic acid, sulphuric acid, gum, albumen, resin, fixed oil, a trace of volatile oil (its odorous principle), lignin, caoutchouc, extractive matter, and numerous salts of inorganic bases.* The first eight are peculiar principles found only in opium ; they may be conveniently classed as follows, with respect both to their chemical and physiological properties, but I should state that a great difference of opinion exists amongst chemists as to the nature, composition, and number of the peculiar principles which exist in opium :—

SUBSTANCES.	MEDICAL PROPERTIES.
1.—ALKALOIDS.	
Morphia ($C^{35}\ H^{20}\ O^{6}\ N$)	Narcotic.
Codeia ($C^{36}\ H^{21}\ O^{6}\ N$)	Narcotic.
Narcotina ($C^{46}\ H^{25}\ O^{14}\ N$)	Bitter ; resembling Quina.
Thebaina ($C^{38}\ H^{2}\ O^{6}\ N$)	Stimulant ; resembling Strychnia.
2.—NEUTRALS.	
Narcein ($C^{46}\ H^{29}\ O^{18}\ N$)	Inert.
Meconin ($C^{10}\ H^{5}\ O^{4}$)	Inert.
Porphyroxin ($C^{66}\ H^{36}\ O^{23}\ N$)	Inert.
3.—ACID.	
Meconic Acid ($C^{14}\ H\ O^{11}$)	Inert.

The constituents of opium are partially soluble in water, either warm or cold, about a third being left undissolved, which consists chiefly of a dark viscid substance resembling caoutchouc, and narcotin ; they are more soluble in alcohol and ether, but a small portion is still left undissolved. The watery infusion is of a dark-brown colour, and has an acid reaction. It is precipitated by the alkalies, and alkaline earths when not added in excess; by the soluble salts of iron and of lead, by the salts of lime and magnesia, by tincture of galls, and by all astringent vegetable matters. Of the different substances above enumerated as existing in opium, the only one of importance in relation to medicine is *morphia*, which has been before described ; it exists in opium combined with meconic and sulphuric acids, in the proportion of from 2 to 8 per cent. according to the quality of the drug. *Codeia* has been used in France by Magendie and others as a narcotic ; it is stated to be about half the strength of morphia. *Narcotina* was at one time generally believed to be the stimulating principle of opium; but more recent investigations, especially those of Dr. O'Shaughnessy of Calcutta, have shown that it is completely devoid of any stimulant or narcotic properties, and that, like quina, it is capable of arresting the paroxysms of remittent and intermittent fevers: more than 160 cases of ague successfully treated with narcotina by himself and others, have been published by this physician. *Thebaina*, from Magendie's experiments, appears to be a powerful poison, one grain injected into the jugular vein, or placed in the pleura, acts like strychnia, causing tetanus and death in a very short time. *Meconic acid* produces a deep cherry-red colour with the persalts of iron; and this forms the most important characteristic of opium in medico-legal researches.

ADULTERATIONS.—Opium is very extensively adulterated, and also varies exceedingly in quality, in consequence of the mode in which it is prepared. Many of the impurities which exist in opium may be detected by a careful physical examination: such as moisture, sand, stones, leaves, woody fibre, pieces of metal, seeds, &c. But by external characters it is very difficult to judge accurately of the quality of opium, and the only sure criterion is to ascertain the quantity of morphia contained in a given specimen of the drug, which may be effected by the process of the Dublin Pharmacopœia for preparing the alkaloid; or by proceeding according to the process of the Edinburgh Pharmacopœia for the preparation of muriate of morphia. "A pound of good opium treated according to the Edinburgh process should yield at least ten per cent. of snow-white salt," (Christison). The following test for the goodness of opium, given in the Edinburgh Pharmacopœia, is intended to indicate the quantity of morphia, narcotina, and resinous extractive contained; but it is difficult of application, and at best can be only a doubtful criterion of quality: "A solution from 100 grains of fine opium macerated 24 hours in f℥ij. of water, filtered and strongly squeezed in a cloth, if treated with a cold solution of ℥ss. of carbonate of soda in two waters, yields a precipitate which weighs when dry at least ten grains, and dissolves entirely in solution of oxalic acid." The following process proposed by M. Payen is one easy of execution and sufficiently accurate for most pharmaceutical purposes:—℥viss. of opium are cut into very thin slices and left to macerate for 24 hours in f℥v. of pure water; then triturated in a mortar till the hydrated matter becomes clear, when the most finely divided parts which the liquid holds in suspension are decanted on a filter. Water is added to the residue which is again triturated, and the whole poured on the same filter and washed with distilled water until the liquor passes through colourless. Recently slaked lime is added in excess to the filtered solution, and the mixture boiled for five minutes and filtered. To the filtered solution sufficient pure hydrochloric acid is added to saturate the lime and combine with the morphia. The morphia is precipitated by ammonia, collected on a filter and washed; it is then dissolved in rectified spirit and crystallized, and the crystals washed with ether to remove the narcotina. The residue, which is tolerably pure morphia, is washed and dried, and then weighed. Good opium thus treated yields from 4 to 5 per cent.

THERAPEUTICAL EFFECTS.—In excessive doses, opium is a powerful narcotic poison, producing giddiness and stupor with scarcely any previous excitement, soon after it is taken ; the stupor increases rapidly, accompanied by complete torpor, slowness of breathing, depressed circulation, general relaxation of the muscles, and contracted pupils ; and unless active treatment be speedily employed, death quickly ensues. In medicinal doses, opium generally produces at first excitement of the vascular system, which is accompanied by exhilaration of the nervous functions ; these effects are marked by an augmented force and frequency of the pulse, with increased heat of the body, and by pleasurable sensations which are experienced throughout the whole system. Soon after, unless the dose be repeated, the sedative influence of the drug becomes obvious ; the general excitement is calmed, pain is diminished, a disinclination to muscular exertion produced, and the force of external impressions on the senses diminished ; this state is succeeded by sleep more or less profound, which lasts usually from six to eight hours. On awaking from the sleep produced by opium, nausea, head-ache, loss of appetite, and indisposition to any active exertion are very generally experienced.

The effects of opium are modified by a variety of circumstances, but most remarkably of all by habit. This is well exemplified by a reference to the customs of some eastern countries, as Turkey, Persia and China, where the drug is commonly employed to produce a species of intoxication or excitement. In the two former countries the opium is eaten, in the latter it is smoked, but in either way the quantity used must be increased daily or it ceases to produce the desired effect. Instances of opium-eating occur also constantly in the British Islands ; and a graphic account of the effects produced by this pernicious habit as experienced by himself, is given by Mr. De Quincy in his *Confessions of an English Opium-eater.* Amongst the Turks, the *Theriaci* (opium-eaters) generally begin with doses of from one to two or three grains, and increase the quantity gradually till it amounts to two, three, or in many instances to six drachms. In this country, too, it is taken in immense quantities by opium-eaters, f℥iij. of laudanum being a common daily allowance, and in some instances, where the vice has been long indulged in, from half a pint to a pint is the quantity taken. These facts should be borne in mind by the medical practitioner, as opium-eaters when labouring under disease require of course very large doses of the drug ; and in all persons, where the use of opium has been continued for any length of time, the dose must be gradually increased.

Individuals are also occasionally met with on whom, although unaccustomed to its use, opium produces but little effect. Christison mentions an instance of "a gentleman of his acquaintance, who though not accustomed to its use, has taken 450 drops of the best laudanum without any other effect than some headache, and constipation; and singularly enough, his son at the age of six took 60 minims of solution of muriate of morphia without any apparent effect." In others, we see a very opposite state of sensibility to the operation of this drug, the sixth or eighth of a grain being a sufficient dose; this extreme sensibility to the action of opium is almost invariably met with in infants and young children; opiates must therefore be employed with great caution in the treatment of their diseases, one drop of laudanum frequently proving a dangerous dose for a child a few weeks old.

The effects of opium are moreover much influenced by disease, as will be evident when I come to speak of the special uses of the drug.

Lastly, by combination with other remedies the operation of opium is greatly modified. Thus, with antimonials or ipecacuanha, its narcotic influence is much diminished, and the diaphoretic powers of these substances remarkably increased; with astringents, as catechu, kino, or chalk, their properties are augmented, while narcotism is not readily produced; and with aromatics or camphor, the stimulant effect of the drug is in general only manifested.

The special uses of opium in the treatment of disease are so very numerous, that I can only subjoin a concise account of the most important of them; mentioning the peculiar circumstances by which its employment is demanded, or contra-indicated. In *fevers*, opium is principally used to procure sleep when there is great watchfulness or delirium present, without excitement of the vascular system, or when they persist after that excitement has been subdued by antiphlogistic treatment. Its effects, however, must be carefully watched, and its use should not be persisted in if the tongue and skin become dry, or if the pupil of the eye be contracted. The combination of tartar emetic with opium, as first proposed by the late Dr. Graves, will often be found particularly useful in fevers attended with much cerebral disturbance. In the *eruptive fevers*, opium when given with due attention to the concomitant symptoms is productive of much benefit, nay, is sometimes imperatively demanded for the safety of the patient; about the eighth or ninth day of the eruption in small-pox, great cerebral disturbance frequently comes on, at first marked by throbbing of the carotids; if opium be not administered immediately on the appearance of this symptom, it is in most instances quickly followed by delirium, coma, and death. In *intermittent fever*, opium given in a large dose at the commencement of the cold stage frequently arrests the paroxysm; if there is any local inflammation or congestion present, its use, however, is contra-indicated.

In *Inflammatory diseases*, given in conjunction with calomel, it acts as a powerful antiphlogistic; one grain of opium with two or three of calomel administered every four or five hours, will be often found a remedy of much power in the inflammations of *membranous* parts: it does not, however, in general prove so useful in the inflammation of the *parenchymatous structure* of organs. In *diffuse in-*

flammation, particularly that fatal form of it which is accompanied by *periostitis*, opium is the most successful remedy which can be employed: it is best given alone in doses of from a quarter of a grain to half a grain every hour or every second hour. Its beneficial influence in this affection depends upon its power of lessening "irritability," and thereby enabling the system to bear up against the disease. After bleeding, either general or local according to circumstances, at the very commencement of an acute attack of *gastritis*, *enteritis*, *peritonitis*, *cystitis*, &c., a full opiate, 60 to 80 drops of the tincture, or from 2 to 3 grains of solid opium, will often arrest the further progress of the disease. In *peritonitis*, caused by rupture of the stomach or intestinal canal, life can be prolonged for even a short period only by the use of very large doses of opium; and in the same disease when it attacks debilitated constitutions or the old and feeble, thus given it is the remedy most to be depended on. In the early stages of *acute dysentery*, opium in full and frequently repeated doses will be found in general to check the disease; the same may be also stated of *diarrhœa* and *common cholera*.

In *acute rheumatism*, when administered as proposed by Dr. Corrigan, it is in some cases productive of the happiest results; to prove useful in this disease, it must be given freely, one grain every second hour, and after a few doses every hour, and this treatment continued for five or six days, or until the disease is subdued; thus employed, it does not cause either dryness of the tongue, headache, or constipation; the duration of the attack is shortened; and the dangerous complications of endocarditis and pericarditis to a great extent prevented. To allay the pain of *gout* and *chronic rheumatism*, it is given in full doses with much advantage.

In *delirium tremens*, opium is the remedy on which most reliance is to be placed; to prove beneficial, it should be employed in very large doses frequently repeated, thus two or three grains of solid opium must be administered every third or fourth hour. The addition of tartar-emetic to the opium, as originally proposed by Professor Law, will generally be found productive of benefit in cases of delirium tremens where opium alone fails to do good. It is more beneficial in *hydrophobia* and in some cases of *tetanus* than any other agent which has been yet employed; in these affections there is a remarkable insensibility to the action of the drug, so that it must be given in very large doses to procure any good result.

In *rupture of the uterus*, given immediately and freely, opium has in some instances saved the life of the patient, and in the treatment of uterine hemorrhage it also proves very beneficial, even when the bleeding proceeds from organic disease.

In *spasmodic* and *convulsive diseases*, opium is also a highly important remedy; as in spasm of the ureter or gall duct from the passage of calculi, in spasmodic stricture, in colic, &c. In all the varieties of neuralgia or other painful affections; in the nervous irritability which follows large losses of blood; in senile gangrene; in cancer; in painful ulcerations; in poisoning with acrid or corrosive substances, &c., opium is very generally employed as a palliative and anodyne. It has been also found a most useful adjunct to animal diet in the treatment of *diabetes*. And lastly, in *venereal diseases* it is combined with mercurials to provent them from running off by the bowels.

Externally, opium is used in the form of infusion, liniment, or plaster; the uses of the two latter will be described amongst the pharmaceutical preparations of the drug. The infusion is applied to recent burns, or inflammation of the skin from other causes; a solution of gr. xij. each of powdered opium and of acetate of lead, infused separately in f℥iv. of tepid water, mixed and strained, forms an excellent lotion in these cases. In *chronic ophthalmia*, or where the inflammation is of a subacute character from the commencement, wine of opium dropped into the eye is found an excellent remedy. Suppositories of opium are placed in the rectum in tenesmus and in painful or spasmodic affections of the neighbouring viscera. Opium has been, in fine, introduced into the urethra to alleviate or overcome certain painful or obstinate affections, such as strangulated hernia, violent colics, especially the nephritic form—ischuria, and spasmodic stricture. Riberi speaks in the strongest terms of this practice of employing the drug,—from two to six grains being the quantity used; he states that it is quite immaterial whether the opium is merely introduced into the urethra or reaches the bladder.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. ss. to gr. iij. or gr. iv., usually given in the form of pill, which may be made with simple mucilage, or, if the pills are to be kept for any time, conserve of roses.

Extractum Opii aquosum, D. *Extractum Opii*, L. *Extractum Opii*, E. ("Take of opium, ℔j.; water, Ovj.; cut the opium into thin slices, macerate it for twenty-four hours in a quart of the water, and decant; macerate the residuum for twelve hours with a second quart of the water, decant, and repeat this process with the rest of the water, subjecting the insoluble residuum to strong expression. Filter the successive infusions and expressed liquor, and evaporate them in a water-bath to a proper consistence," D. "Opium, powdered, ℔iss.; distilled water, Ov.; add gradually Oij. of water to the opium, and macerate for twenty-four hours frequently stirring with a spatula, then strain; macerate the residuum in the rest of the water for twenty-four hours and strain; then evaporate the liquors to a proper consistence," L. "Opium, ℔j.; water, Ov.; cut the opium into small fragments, macerate it for twenty-four hours in a pint of water, break down the fragments with the hand, express the liquid with pretty strong pressure; break down the residuum again in another pint of water, let it macerate for twenty-four hours, and express the liquid; repeat the maceration and expression in the same way till the water is all used. Filter the successive infusions as they are made, passing them through the same filter; unite and evaporate them in the vapour-bath to the proper consistence," E.).

A very bad preparation, and one which should be expunged from the pharmacopœias; during the prolonged evaporation, the morphia forms a very insoluble compound with the resinoid matter of the opium, which must of course tend to lessen the activity of the drug. It is administered in the same doses as the powder.

Pilulæ Opii sive Thebaicæ, E. (Opium, 1 part; sulphate of potash, 3 parts; conserve of red roses, 1 part; beat them into a proper mass, and divide into five grain pills.) Each pill contains gr. j. of opium. Dose, one to three pills. The sulphate of potash is merely used as a mechanical agent, to divide the opium.

Pilulæ Saponis compositæ, D. L. ("Opium, in fine powder, ℥ss.; Castile soap, ℥ij.; distilled water, f℥ss.; or as much as is sufficient; reduce the soap to a fine powder, add the opium and water, and beat the mixture into a mass of a uniform consistence," D. "Opium, powdered; liquorice powder, of each, ʒij.; soft soap, ʒvj.; pound together to form a mass," L.) Five grains contain one grain of opium. Dose, gr. iij. to gr. x.

Pilula Styracis composita, L. *Pilulæ Styracis*, E. ("Prepared storax, ʒvj.; opium, powdered; saffron, of each, ʒij.; pound together to form a mass," L. "Extract of storax, 2 parts; opium; and saffron, of each, 1 part; beat them into a uniform mass, which is to be divided into four grain pills," E.) Every five (four, E.) grains contain one grain of opium. The storax and saffron completely conceal the odour and taste of the opium, and the name enables us to prescribe the drug without the knowledge of our patients, a matter often of very great importance.

Confectio Opii, L. *Electuarium Opii*, E. ("Opium, powdered, ʒvj.; long pepper, ℥j.; ginger powdered, ℥ij.; caraway ℥iij.; tragacanth, powdered, ʒij.; syrup, f℥xvj.; rub the dry ingredients together to a very fine powder, and keep it in a close vessel; and whenever the confection is to be used, add the powder gradually to the syrup made hot, and mix," L. "Aromatic powder, ℥vj.; seneka, in fine powder, ℥iij.; opium, diffused in a little sherry, ℥ss.; syrup of ginger, ℔j.; mix them together, and beat them into an electuary," E.) About thirty grains, L. (forty-three grains, E.) contain gr. j. of opium. It is an aromatic and anodyne compound, chiefly used as an addition to chalk mixture in diarrhœa. Dose, gr. x. to ʒj.

Trochisci Opii, E. (Opium, ʒij.; tincture of tolu, ℥ss.; syrup, f℥viij.; powder of gum arabic; and extract of liquorice, softened with boiling water, of each, ℥v.; reduce the opium to a fluid extract by the formula for *Extractum Opii*, mix it intimately with the liquorice previously reduced to the consistence of treacle; add the tincture, sprinkle the gum and sugar into the mixture, and beat it into a proper mass, which is to be divided into lozenges of ten grains.) Seven lozenges contain about gr. j. of opium; they are principally employed to allay troublesome cough.

Tinctura Opii, D. L. E. ("Opium, in coarse powder, ℥iij.; proof spirit, Oij.; macerate for fourteen days, strain, express, and filter," D. "Opium, powdered, ℥iij.; proof spirit, Oij.; macerate for seven days, express, and filter," L. "Opium, sliced, ℥iij.; rectified spirit, Oj. f℥vij.; water, f℥xiiss.; digest the opium in the water at a temperature near 212° for two hours, break down the opium with the hand, strain and express the infusion, macerate the residuum in the spirit for about twenty hours, and then strain and express very strongly, mix the watery and spirituous infusions, and filter. This tincture is not so easily obtained by percolation, but when the opium is of fine quality, it may be prepared thus: slice the opium finely, mix the spirit and water, let the opium macerate in f℥xiv. of the mixture for twelve hours and then break it down thoroughly with the hand, pour the whole fluid and pulpy mass into a percolator, and let the fluid part pass through, add the rest of the spirit without packing the opium in the cylinder, and continue the process till Oij. are obtained," E.) The tincture of opium, *laudanum*, of the three pharmacopœias is about the same strength; according to Christison, min. xiiiss., or about twenty-five drops, contain the active part of one grain of opium. It is the most generally employed of the preparations of opium, the spirituous menstruum dissolving all the active principles of the drug, and enabling us to apportion our doses with great accuracy. Dose, min. x. to min. xxx.

Tinctura Opii Camphorata, D. E. *Tinctura Camphoræ composita,* L. (" Opium, in coarse powder; benzoïc acid, of each, ʒiss.; camphor, ʒj.; oil of anise, fʒj.; proof spirit, Oij.; macerate for fourteen days, strain, express, and filter," D. " Camphor, ℈iiss.; opium, powdered; benzoïc acid, of each, gr. lxxij.; oil of anise, fʒj.; proof spirit, Oij.; macerate for seven days, and filter," L. " Opium, sliced; and benzoïc acid, of each, ℈iv.; camphor, ℈iiss.; anise-oil, fʒj.; proof spirit, Oij.; digest for seven days, and filter," E.) *Paregoric elixir.* The name adopted by the London College for this preparation is the most convenient, as it enables us to prescribe opium without the knowledge of our patients; it also serves to distinguish it better from the simple tincture, and thus prevent errors in dispensing. According to Christison, the active matter of one grain of opium is contained in 267 minims, or about 500 drops of the preparation of the London Pharmacopœia (the Dublin is a little stronger), and in 240 minims, or about 450 drops of that of Edinburgh. It is very much employed as an anodyne in pectoral affections unaccompanied by inflammation. Dose, fʒj. to fʒiij.

Acetum Opii, D. E. (" Take of opium, in coarse powder, ℥iss.; dilute acetic acid, Oj.; macerate for seven days in a close vessel, with occasional agitation; then strain with expression, and filter," D. " Opium, ℥iv.; distilled vinegar, f℥xvj.; triturate the opium cut into small fragments, into a pulp with a little of the vinegar, add the rest of the vinegar, macerate in a closed vessel for seven days, and agitate occasionally, then strain, express strongly, and filter the liquors," E.) This preparation of opium is preferred by many to laudanum, as being less apt to occasion the disagreeable subsequent effects of the drug. The preparation of the Dublin Pharmacopœia is the same strength as laudanum, of that of Edinburgh about twenty drops are equivalent to thirty of the tincture of opium. Dose, (D.) min. x. to min. xxx. ; (E.) min. viij. to min. xxv.

Tinctura Opii Ammoniata, E. (Benzoïc acid; and saffron, chopped, of each, ʒiij. ; opium, sliced, ʒij. ; anise-oil, ʒss. ; spirit of ammonia, Oj. ; digest for seven days, and filter.) This preparation is called in Scotland, *Scotch Paregoric ;* it is used as an anodyne and antispasmodic. The active matter of one grain of opium is contained in eighty minims, or about 150 drops, (Christison.) Dose, fʒj to fʒij.

Vinum Opii, D. L. E. ("Take of opium, in coarse powder, ℥iij. ; sherry wine, Oij. ; macerate for fourteen days, with occasional agitation, then strain with expression, and filter," D. "Extract of opium, ℥iiss. ; cinnamon, bruised; cloves, bruised, of each, ʒiiss. ; sherry wine, Oij. ; macerate for seven days, and filter," L. "Opium, ℥iij. ; cinnamon, in moderately fine powder ; and cloves bruised, of each, ʒiiss. ; sherry, Oij. ; digest for seven days, and filter," E.) This preparation is more agreeable both in smell and taste than laudanum ; it is, however, seldom employed internally, being chiefly used as an application to the eye in chronic ophthalmia. The active matter of one grain of opium is contained in about min. xvij. of the Dublin and Edinburgh wine ; and in min. xx. of the London. Dose, for internal use, min. x. to fʒss.

Enema Opii, L. E. ("Decoction of starch, f℥iv. ; tincture of opium, min. xxx. ; mix," L. "Starch, ʒss. ; tincture of opium, fʒss. to fʒj. ; water, f℥ij. ; boil the starch in the water, and when it is cool enough for use add the tincture of opium," E.). Used as an anodyne in irritable states of the bowels. On the continent it is generally stated that opium acts much more energetically when administered in the form of enema than when given by the mouth ; but the contrary opinion is held universally by British practitioners, who generally employ three or four times the quantity when administered by the rectum.

Linimentum Opii, D. L. E. ("Tincture of opium ; soap liniment, of each, f℥j. ; mix them with agitation," D. "Tincture of opium, f℥ij. ; soap liniment, f℥vj. ; mix," L. "Castile soap, ℥vj. ; opium, ℥iss. ; camphor, ℥iij. ; oil of rosemary, fʒvj. ; rectified spirit, Oij. ; macerate the soap and opium in the spirit for three days, filter, add the oil and camphor, and agitate briskly," E.) *Anodyne liniment,* used as an embrocation in rheumatic pains, neuralgia, &c.

Emplastrum Opii, D. L. E. ("Take of opium, in very fine powder, ℥j.; resin plaster, ℥ix. ; melt the plaster by means of a steam or water bath, then add the opium by degrees, and mix thoroughly," D. "Extract of opium, ℥j. ; lead plaster, ℥viij.; prepared frankincense, ℥ij.; boiling water, f℥j.; to the melted frankincense, add the plaster dissolved over a slow fire, and the extract previously mixed with water ; evaporate with a gentle heat, constantly stirring, until a proper consistence is obtained," L. "Opium, in powder, ℥ss.; burgundy pitch, ℥iij. ; litharge plaster, lbj. ; melt the plaster; add the pitch and opium by degrees, and mix them thoroughly," E.) Used as an anodyne application in local pains.

Unguentum Opii, L. (Opium, powdered, ℈j.; lard, ℥j.; rub together.) Used to allay pain in inflamed parts and irritable sores; it should be applied with caution, as opium is rapidly absorbed from the surface of the body, when denuded of the cuticle.

Black drop, (Opium, sliced, ℔ss.; expressed juice of the wild crab, Oiij.; nutmegs, bruised, ℥iss.; saffron, ℥ss.; boil to a proper consistence, then add of pure sugar, ℥iv.; yeast, two spoonfuls; set the whole in a warm place near the fire for six or eight weeks, then place it in the open air until it becomes a syrup; and lastly, decant, filter, and bottle it, adding a little sugar to each bottle.) This preparation resembles the officinal *Acetum Opii;* it is highly prized by many practitioners, and is said not to produce the disagreeable subsequent effects of most of the other preparations of the drug. It is more than twice the strength of laudanum, but of late years it has been very irregularly prepared, is found to vary much in its strength, and is consequently uncertain in its operation. Moreover, it is not now to be met with in the shops prepared according to the original secret formula.

Liquor Opii Sedativus, COOLEY. (Dry opium, in powder, 1 part; clear washed sand, 2 parts; mix and moisten with water; put the mass into a percolator, and pass distilled water, heated to 70° F. through the ingredients till it passes both tasteless and colourless. Evaporate the liquor over the water-bath to the consistence of a hard pill extract. Take of this extract, ℥iij.; distilled water, f℥xxx.; boil for two minutes, let it cool and filter; then add of rectified spirit, f℥vj.; and distilled water, a sufficiency to make up Oij.) This preparation, similar to Battley's sedative solution—a favourite with many practitioners—is about the same strength as laudanum, than which it is said to be less stimulating.

INCOMPATIBLES.—The alkalies, and lime water, unless they are added in excess; the carbonates of the alkalies; acetate and diacetate of lead; sulphates of iron, copper, and zinc; arsenite of potash; corrosive sublimate; and all astringent vegetable preparations.

In cases of poisoning with opium, the use of the stomach pump and stimulating emetics should immediately be had recourse to; external stimulants, such as cold affusion, loud talking, compelled exertion, as forcing the patient to walk between two assistants, the application of ammonia or strong acetic acid to the nostrils, &c., be employed; internal stimulants, the best of which are brandy, ammonia and its carbonate, strong coffee, camphor and musk, administered; and if all other remedies fail, artificial respiration and galvanic shocks made use of, the assiduous application of which has in some almost hopeless cases restored life; in one instance on record, artificial respiration was kept up for nearly three hours.

PAPAVER, L. E. PAPAVER SOMNIFERUM, CAPSULÆ, D.—*Poppy-heads. The dried (ripe, L., not quite ripe, E.) capsules of Papaver somniferum.* This plant has been described in the last article; the heads are most active when gathered before they are quite ripe, as directed by the Edinburgh College; they should be dried in the sun.

PHYSICAL PROPERTIES.—They are globular, about the size of an apple, crowned with the persistent, many-rayed stigma; their structure is thin and fragile; they have a feeble narcotic odour, and a weak somewhat bitter taste. They contain many bland seeds, which yield by expression a yellowish fixed oil.

CHEMICAL PROPERTIES.—Poppy-heads contain a very minute proportion of the different substances found in opium, with a large quantity of woody fibre. They yield their virtues to cold and boiling water, and to spirit.

THERAPEUTICAL EFFECTS.—Any medical virtues which poppy-heads possess depend on the presence of a small quantity of opium, they are consequently apt to vary much in strength. They are chiefly used in the form of decoction as a fomentation to inflamed or painful parts. The following officinal preparations are sometimes used internally as substitutes for opium:—

Extractum Papaveris, L. E. (" Poppy-heads without seeds, bruised, ℥xv.; boiling distilled water, cong. j.; macerate for twenty-four hours, then boil down to four pints; strain the liquor while hot, and evaporate to a due consistence," L. Poppy-heads, without seeds, ℥xv.; boiling water, cong. j.; macerate for twenty-four hours; boil down to Oiv.; filter the liquor hot, and evaporate in the vapour-bath to the due consistence," E.) Its effects are somewhat similar to those of opium; it is but rarely used. Dose, gr. ij. to gr. xx.

Syrupus Papaveris, L. E. ("Poppy-heads, without the seeds, bruised, ℔iij.; boiling distilled water, cong. v.; rectified spirit, f℥v.; boil down the capsules in the water to cong. ij., and press strongly; boil down the strained liquor again to Oiv., and strain while hot, set it by for twelve hours that the dregs may subside, then boil down the clear liquor to Oij.; add ℔v. of sugar and dissolve it, and finally mix in the spirit," L. " Poppy-heads, without seeds, ℔iss.; boiling water, Oxv.; sugar, ℔iij.; slice the poppy-heads and infuse them for twelve hours in the water, boil down to Ov., strain and express strongly through calico; boil again to Oiiss., then add the sugar, and dissolve it with the aid of heat," E.) As this preparation does not keep well, the London College have in the last edition of their Pharmacopœia added spirit in the preparation; with the same intention some pharmaceutists prepare it with cold water, macerating for a longer period. Syrup of poppies is usually employed as a narcotic in infantile diseases; it should be administered to infants and children with great caution, for in more than one instance a teaspoonful has proved fatal to a healthy infant; this care is particularly requisite, as a preparation made by adding laudanum to simple syrup is frequently substituted for the true syrup. Dose, for infants and children, fʒss. to fʒij. ; for adults, f℥ss. to f℥j.

Decoctum Papaveris, D. L. E. (" White poppy capsules, sliced or bruised, ℥iv.; water, Oiij. ; boil for ten minutes in a covered vessel, and strain," D. " Poppy-heads, bruised, ℥iv.; distilled water, Oiv.; boil for a quarter of an hour and strain," L. " Poppy-heads, sliced, ℥iv. ; water, Oiij.; boil for fifteen minutes, and strain," E.) For external use only.

RHŒAS, L. RHŒADOS PETALA, E. PAPAVER RHŒAS, PETALA, D.—*The (fresh,* L.*) petals of Papaver rhœas. The Red or Corn poppy.* Indigenous; belonging to the Natural family *Papaveraceæ*, and to the Linnæan class and order *Polyandria Monogynia.*

BOTANICAL CHARACTERS.—A slender annual, 2–3 feet high ; stem, bristly, many flowered, its bristles and those of the flower stalks spreading ; Leaves, pinnatifid ; Flowers, with broad, deep scarlet petals : Capsules, glabrous, nearly globose.

PROPERTIES.—The petals should be collected immediately after their expansion, as they drop off easily ; they should be dried quickly, so as to preserve their colour. In the recent state, red poppy petals are of a rich scarlet colour, which becomes darker by drying ; they have a feeble odour of opium, and a slightly bitter taste. They consist of a vegetable albumen, red colouring matter, astringent matter, soft resin, wax, gum, and some salts, (Beetz and Ludurg.) It is probable that they also contain a trace of morphia. They yield their colouring matter and other principles to boiling water.

THERAPEUTICAL EFFECTS.—The petals of the red poppy probably possess some feeble narcotic properties, but they are used in medicine in the form of syrup, only as colouring ingredients, in consequence of their fine rich colour.

Syrupus Rhœados, L. E. (" Red poppy petals, ℔j.; boiling distilled water, Oj. ; sugar, ℔iiss. ; rectified spirit, f℥iiss., or a sufficiency ; add the petals gradually to the water heated in a water-bath, stirring occasionally ; then the vessel being removed from the bath, macerate for twelve hours, press out the liquor with the hand, and strain ; and complete the process as directed for syrup of marshmallow," L. "Corn-poppy, ℔j.; boiling water, Oj. ; pure sugar, ℔iiss. ; heat the water over a vapour-bath ; add the petals by degrees, stirring occasionally; remove the vessel from the bath, infuse for twelve hours; strain and express the liquor ; add to it the sugar, and dissolve this with the aid of heat." E.) This syrup does not keep well, for which reason the spirit has been added in the last edition of the London Pharmacopœia.

STRAMONIUM, D. E. STRAMONII FOLIUM ET SEMEN, L.—*Stramonium. Thorn-apple. The seeds* D.—*The herb,* E.—*The leaf* *and seed*, L.—*of Datura stramonium*. Indigenous; belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—A herbaceous annual; Stem, much branched, forked, spreading, leafy; Leaves, ovate, angulato-sinuate, glabrous; Flowers, axillary, large, erect, white; Fruit, an ovate capsule, erect, clothed with numerous nearly equal spines, 4 celled at the base, 2 celled at the summit, many seeded.

PREPARATION.—The whole herb should be collected when the plant is in flower, and carefully dried as quickly as possible with a gentle heat. The leaves should be removed from the stem and branches, which are to be rejected. The seeds when fully ripe are black, and should be then gathered.

PHYSICAL PROPERTIES.—As usually met with, the dried herb is chopped into small pieces; it is of a greenish-white colour; and has a feeble narcotic odour—which in the fresh state is strong and heavy—and a bitter nauseous taste. The seeds are small, kidney-shaped and rough; when bruised they have the same odour as the herb—their taste is nauseous and bitter. The herb has been unaccountably omitted from the last edition of the Dublin Pharmacopœia.

CHEMICAL PROPERTIES.—The seeds contain fixed oil, wax, resin, extractive, gummy matter, malic acid, some salts, and a peculiar alkaloid, which has been named *Daturia*. Geiger and Hesse first obtained it in a pure state; it is in colourless prismatic crystals, slightly volatile, soluble in 280 parts of cold, and in 72 parts of boiling water, also soluble in alcohol, but slightly so in ether; it forms crystalline salts with acids, but its exact chemical composition has not been yet ascertained. Daturia has not been employed in medicine; but it is on it that the therapeutical properties of stramonium appear to depend. It exists also in the leaves. Both herb and seeds yield their virtues to water and to alcohol; but their activity is much impaired by long boiling, as in preparing the watery extract.

THERAPEUTICAL EFFECTS.—Stramonium leaves and seeds act as powerful narcotics, in large doses proving fatal with all the symptoms of narcotic poisoning. In medicinal doses, as might be expected from the supposed identity of their active principles, they produce effects nearly similar to those of belladonna and henbane, and have been consequently used with the same intention in the treatment of disease. In neuralgic affections, as tic douloureux and sciatica, in chronic rheumatism, and in all forms of chronic disease attended with acute pain, administered in small doses frequently repeated until its narcotic influence is manifested, stramonium is a remedy of great power, and deserves to be more generally employed than it is. The inhalation of the vapour of the cut herb when burned, is frequently found of much service in the treatment of spasmodic asthma; it is used with a common pipe in the same way as tobacco, or in the form of cigar prepared by rolling the leaf. The smoking of stramonium, however, should be employed with great caution, and used only in very small quantities at a time, as in many instances it has produced dangerous symptoms; and it should never be prescribed for very old persons, or in cases where there is a tendency to apoplexy or to paralysis.

DOSE AND MODE OF ADMINISTRATION.—Of the powder of the herb or leaves, gr. j. to gr. iv. ; of the seeds, gr. ¼ to gr. j., gradually increased until some obvious effect is produced. For smoking, gr. x. to gr. xx. of the chopped herb may be used, but the patient should be directed to allow an interval of at least three minutes to intervene between each inhalation of the smoke, whether a common pipe or a stramonium cigar be employed ; and the effects caused by it must be carefully watched.

Extractum Stramonii, L. E. (" Stramonium seeds, ℥xv. ; boiling distilled water, cong. j. ; macerate for four hours in a vessel lightly covered near the fire, then take out the seeds, bruise them in a stone mortar, and when bruised return them to the liquor ; then boil down to Oiv. ; strain the liquor while hot, and evaporate to a proper consistence," L. " Take of stramonium seeds any convenient quantity, grind them well in a coffee mill, rub the powder into a thick mass with proof spirit, put the pulp into a percolator and transmit proof spirit till it passes colourless ; distil off the spirit and evaporate what remains in the vapour-bath to a proper consistence," E.). This extract is best prepared according to the directions of the Edinburgh Pharmacopœia, being more certain as well as more active. Dose, gr. ¼. ; gradually increased.

Tinctura Stramonii, D. (Stramonium seeds, bruised, ℥v. ; proof spirit, Oij. ; macerate for fourteen days, strain, express, and filter.) This tincture may be very conveniently prepared by thoroughly moistening the stramonium seeds, in powder, with diluted alcohol, allowing it to stand for twenty-four hours, then transferring to an apparatus for displacement, and gradually pouring upon it diluted alcohol until two pints of filtered liquid are obtained. An excellent preparation. Dose, min. x. to min. xxx.

INCOMPATIBLES.—The mineral acids ; caustic alkalies ; the salts of iron, lead, mercury, and silver ; and according to the observations of Dr. Garrod, potash and soda (See p. 284).

In poisoning with stramonium, the same treatment should be employed as in poisoning with belladonna.

TOXICODENDRON.—*Sumach or Poison-oak leaves. The leaves of Rhus toxicodendron.* A native of North America ; belonging to the Natural family *Anacardiaceæ,* and to the Linnæan class and order *Pentandria Trigynia.* It is now omitted from the three British Pharmacopœias, and is placed in the *secondary* list of the Materia Medica in the United States Pharmacopœia ; as it is occasionally, though very rarely, used in this country, I have thought it better to retain for the present the following short notice of it.

BOTANICAL CHARACTERS.—A small shrub ; Stems, numerous, branching ; Leaves, pinnate, trifoliate ; Flowers, greenish-white.

PHYSICAL PROPERTIES.—The leaves and branches in the recent state abound in an acrid milky juice which becomes black on exposure to the air; so acrid is this juice that even the emanations from the shrub will in some persons produce heat, redness, and sometimes erysipelatous inflammation, if they are exposed to its influence. In the dry state the leaves have no odour; they have a weak somewhat acrid taste.

CHEMICAL PROPERTIES.—No chemical analysis has been made of this plant; the milky juice probably contains a volatile narcotico-acrid principle. In the dry state, the usual tests indicate the presence of tannin, gallic acid, and resinous extractive.

THERAPEUTICAL EFFECTS.—In large doses toxicodendron acts as a narcotico-acrid poison. It has not been much employed in medicine, as the leaves are nearly inert in the dry state, owing to the volatility of their active principle. They were at one time much vaunted as a remedy for paralysis, particularly paraplegia, in cases where the disease was supposed to depend on a torpid condition of the nerves.

DOSE AND MODE OF ADMINISTRATION.—Of the powdered leaves, gr. j. to gr. v., three or four times a-day.

Tinctura Toxicodendri, (Toxicodendron leaves, ℥j.; rectified spirit, f℥xij.; distilled water, f℥iv.; mix, digest for six days, and filter.) Dose, fʒss. to fʒj. three times daily.

CHAPTER XV.

REFRIGERANTS.

(Temperants.)

Refrigerants are prescribed in the treatment of disease with the view of diminishing the heat of the body when it is morbidly increased, and of causing a sensation of coolness throughout the system. Actual experiment has proved that although when taken into the stomach they cause a refreshing or cold feel over the whole body, they do not really diminish the temperature ; consequently it has been hitherto found impossible to explain satisfactorily the phenomena which follow their internal use. In their external application as cooling or evaporating lotions to inflamed parts, the mode of operation is readily understood, the temperature of the part to which they are applied being actually lowered. The principal use of refrigerants in the practice of medicine is in the treatment of febrile and inflammatory affections, in which the benefit they produce appears to depend on the fact, that their direct action on the stomach occasions sympathetically a transient reduction in the force of the circulation. During their administration, irritability is also allayed, and the morbid sensations of heat, thirst, and nausea are diminished.

Acetum.—*Vinegar* (described in the division *Astringents*), is a useful refrigerant in febrile or inflammatory affections. It is not much employed as such internally, nevertheless fʒss. to f℥j. diluted with f℥xx. of water forms a cooling drink, and may be taken *ad libitum* in cases where its astringent property is not objectionable. As an external refrigerant, its action is attended with much benefit in the treatment of most febrile and inflammatory diseases ; it should be applied by means of a sponge to the surface of the body : to form a solution for this purpose, fʒj. is mixed with f℥iij. of cold or tepid water according to circumstances. For internal use the simple oxymel of the Dublin and London Pharmacopœias is well adapted, or the following preparation may be used :—

Syrupus Aceti, E. (Vinegar, French in preference, f℥xj. ; pure sugar, ℥xiv. ; boil them together.) Dose, fʒij. to f℥j as an adjunct to other medicines.

ACIDUM CITRICUM, D. L. E.—*Citric acid. An acid prepared from the juice of Citrus limonum, and other species*, L.

PREPARATION.—An article of the Materia Medica in the last editions of the Dublin and London Pharmacopœias, being almost invariably prepared now on the large scale by manufacturing chemists, several processes having been patented for the preparation of both it and tartaric acid. *Edinburgh.*—"Lemon juice, Oiv.; prepared chalk, ℥ivss., or a sufficiency; dilute sulphuric acid, f℥xxxvj., or in the same proportion to the chalk required; boil the lemon juice, let it rest, pour off the clear liquor, boil this again, and add the chalk to it while hot by degrees, till there is no more effervescence, and the liquid ceases to taste acid. Collect the precipitate and wash it with hot water till the water passes colourless, squeeze the residuum in a powerful press; mix it uniformly with Oij. of distilled water, and then add the sulphuric acid by degrees, and with constant stirring. Try whether a small portion of the liquid, when filtered, gives with solution of nitrate of baryta, a precipitate almost entirely soluble in nitric acid; and if the precipitate is not nearly all soluble, add a little citrate of lime to the whole liquor till it stand this test. Separate now the clear liquor by subsidence or filtration, washing the insoluble matter with cold water, and adding the washings to the liquor; concentrate with a gentle heat till crystals form on the surface, set the liquor aside to cool and crystallize, and purify the crystals by repeated solution and crystallization till they are colourless."

PHYSICAL PROPERTIES.—Citric acid crystallizes in transparent, colourless, regular rhomboidal prisms, terminated by four trapezoidal faces. They are inodorous, but have an agreeable, purely acid taste. Specific gravity, 1·617.

CHEMICAL PROPERTIES.—Crystalline commercial citric acid consists of $C^{12} H^{5} O^{11}, 3\,HO, + HO$, but on cooling a saturated solution at 212°, it crystallizes with two equivalents less of water. The crystals are permanent in the air; heated at 212°, they part with their water of crystallization, and at a higher temperature are decomposed; 100 parts of citric acid are soluble in seventy-five parts of cold, or fifty of boiling water; the solution undergoes decomposition when kept even in close vessels, and becomes covered with mould. If pure, the crystals dissolve completely in alcohol. Citric acid is readily distinguished by the following characteristic: when a few drops of a solution of the acid are added to lime water, a clear liquid results, which on being heated becomes turbid, from the deposition of a white precipitate,—citrate of lime.

ADULTERATIONS.—Citric acid is liable to be adulterated with sulphuric or tartaric acid, sulphates, tartrates, and lime. The presence of sulphuric acid or the sulphates is detected by adding acetate of lead to a solution of the acid; if the impurity be present, the precipitate occasioned is not dissolved by nitric acid. The presence of tartaric acid or the tartrates is shown by a crystalline precipitate being formed, on the addition of carbonate of potash dissolved in water, to a solution of the acid in excess. Lime or any other fixed impurity is detected by incinerating the acid with the aid of a little red oxide of mercury; if it be pure, no ash or a mere trace will be left. The following are the characteristics and tests for citric acid given in the last edition of the London Pharmacopœia: "Colourless; totally or almost totally dissipated by heat; soluble in water and in spirit; nitric acid dissolves the precipitate produced in the watery solution by acetate of lead; no salt of potash except the tartrate causes any precipitate with it; added sparingly to cold lime water, it does not render it turbid; 100 grains dissolved in water are saturated by 205·7 grains of carbonate of soda in crystals."

THERAPEUTICAL EFFECTS.—Citric acid produces the refrigerant effects of lemon-juice, as a substitute for which it may be employed to form cooling drinks in febrile affections, but fresh lemon-juice should be preferred whenever it can be obtained.

DOSE AND MODE OF ADMINISTRATION.—℈j. to ʒj. To prepare a solution of the same strength as lemon-juice, ʒviiiss. of the acid are to be dissolved in f℥xv. of water. Citric acid is also employed to form effervescing draughts with the alkaline carbonates; gr. xx. of the acid are saturated by about gr. xxix of crystalline bicarbonate of potash, or gr. xlj. of crystalline carbonate of soda, or gr. xxiv. of bicarbonate of soda, or gr. xvij. of hydrated sesquicarbonate of ammonia.

Syrupus Acidi Citrici, D. (Take of citric acid in powder; distilled water, of each, ℥iiss.; tincture of lemon peel, fʒv.; simple syrup, Oiij. Dissolve the acid in the water with the aid of heat; then add the solution and tincture of lemon peel to the syrup, and mix with agitation.) Intended as a substitute for the syrup of lemons of former pharmacopœias; it will keep better, but the presence of spirit renders it unsuited for many purposes, and it also has not the agreeable fresh flavour of the syrup prepared from lemon-juice. Dose, fʒij. to f℥j.; one ounce contains nearly a scruple of citric acid.

Pulveres Effervescentes Citrati, D. (Take of crystals of citric acid, ʒix; bicarbonate of soda, ʒxj., *or*, bicarbonate of potash, ʒxiij.; Reduce the acid and alkaline bicarbonates, separately, to a fine powder, and divide each into eighteen parts. The acid and alkaline powders should be kept in papers of different colours.) These powders should only be prepared when required for use, and not kept in boxes for months as is commonly done.

INCOMPATIBLES.—The alkalies; carbonates; acetates; the alkaline and earthy sulphurets; and tartrate of potash.

ACIDUM OXALICUM.—*Oxalic acid.*

PREPARATION.—It is prepared on a large scale as an article of commerce for use in the arts, by the action of nitric acid on treacle or potato starch. For use in medicine it may be further purified by dissolving in water and re-crystallizing.

PHYSICAL PROPERTIES.—Oxalic acid crystallizes in four-sided oblique prisms with dihedral summits; it is odourless but has a very acid taste. Specific gravity, 1·50.

CHEMICAL PROPERTIES.—It is composed of two equivalents of carbon and three of oxygen, combined in the crystalline state with three of water, $C^2\ O^3\ HO + 2\ HO$.: recent chemical investigations almost prove that this acid is an oxide of oxalyle ($C^2\ O^2$ = to 2 equivalents of carbonic oxide.) The crystals effloresce in the air and lose two equivalents of their water of crystallization; exposed to a temperature of 354° F. they melt, and are partly decomposed, one portion subliming, and the other being converted into carbonic oxide, carbonic acid, and formic acid. Oxalic acid is very soluble in water and in alcohol, requiring but from eight to ten parts of water at 60° F., its own weight of boiling water, and four parts of cold alcohol; it also dissolves unchanged in dilute nitric and sulphuric acids. The watery solution reddens litmus paper, and decomposes the carbonates with effervesence. The best characteristic of oxalic acid is the action of nitrate of silver on its solution : it produces a white precipitate, soluble in nitric acid, which, when heated over the flame of a spirit lamp, detonates feebly.

THERAPEUTICAL EFFECTS.—Oxalic acid is a powerful poison, when taken in large doses or in concentrated solution acting as a corrosive, while a weak solution produces death with marked symptoms of depression of the circulation and of the nervous system.* It is but rarely used as a medicine in this country, but on the continent it is employed as a refrigerant in the form of lemonade. From the result of the observations of M. Nardo, who has used this acid very extensively, it is to be preferred to the other vegetable acids as a refrigerant and antiphlogistic in all acute inflammations of mucous membranes, more especially when the stomach is the seat of the disease; and from my own experience of several such cases in which I employed it, I can fully confirm this statement.

DOSE AND MODE OF ADMINISTRATION.—From gr. j. to gr. ij. dissolved in f℥j., or f℥ij. of water. Gr. x. give an agreeable acidity to Oj. of water, and half this quantity may be taken in the twenty-four hours. The solution may be sweetened with sugar if preferred.

In poisoning with this acid, chalk, whiting, or magnesia suspended in water, should be *at once* administered, and vomiting *afterwards* excited by emetics, or by the use of the stomach pump.

ACIDUM TARTARICUM, D. L. E.—*Tartaric acid. An acid prepared from bitartrate of potash.*

PREPARATION.—An article of the Materia Medica in the last editions of the Dublin and London Pharmacopœias. (See observations on the preparation of citric acid, page 317.) *Edinburgh.*—Bitartrate of potash, ℔iv.; boiling distilled water, cong. iiss.; prepared chalk, ℥xxv. ʒvj.; dilute sulphuric acid, Ox. f℥vij.; muriatic acid, f℥xxviss., or a sufficiency; boil the bitartrate with cong. ij. of the water, and add gradually half the chalk; when the effervescence is over, add a solution obtained by dissolving the rest of the chalk in the muriatic acid diluted with Oiv. of the water. After the tartrate of lime has subsided, pour off the liquid, and wash the tartrate with distilled water, till it is tasteless; pour the sulphuric acid on the tartrate, and boil for fifteen minutes; evaporate with a gentle heat, to obtain crystals. Purify by repeated solution, filtration, and crystallization.

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* Poisoning with oxalic acid most frequently occurs in consequence of its being mistaken for sulphate of magnesia, to which it bears much resemblance. It may be readily distinguished from the latter by pouring a few drops of common writing ink on the crystals, which are changed to a reddish-brown colour by oxalic acid, but no effect is produced by sulphate of magnesia. Moreover, the solution of Epsom salts tastes nauseous and bitter, while that of oxalic acid is purely and intensely acid, not at all bitter.

PHYSICAL PROPERTIES.—Tartaric acid occurs in white, semitransparent crystals of considerable size, the primary form of which is the right rhombic prism; it is inodorous, but has a purely acid taste. Specific gravity, 1·75.

CHEMICAL PROPERTIES.—In the crystalline state it consists of $C^4 H^2 O^5$ with two equivalents of water. The crystals are permanent in the air; exposed to heat, they fuse in their water of crystallization, which is all driven off if the temperature be raised; and at a temperature considerably below redness, the acid is decomposed, and a series of new compounds formed. Tartaric acid is soluble in twice its weight of cold, and in half its weight of boiling water, it is also soluble in alcohol. The aqueous solution becomes mouldy by keeping. The most distinguishing characteristic of this acid is the crystalline precipitate, which is produced when it is added in excess to a concentrated solution of a salt of potash.

ADULTERATIONS.—Tartaric acid is adulterated with bitartrate of potash, and with lime; the former may be detected by its little solubility in cold water; the latter by an ash being left, on the acid being incinerated with the acid of red oxide of mercury. The following are the characteristics and tests given for it in the last edition of the London Pharmacopœia:—"Colourless; totally or almost totally destroyed by heat; soluble in water; this solution precipitates bitartrate of potash from any neutral salt of potash; nothing is precipitated from the same solution by chloride of barium; whatever is precipitated by acetate of lead is soluble in nitric acid; 100 grains of this acid dissolved in water are saturated by 192 grains of crystals of carbonate of soda."

THERAPEUTICAL EFFECTS.—To prepare refrigerant drinks in febrile and inflammatory diseases, tartaric acid, as being cheaper than citric acid, is much employed. Its principal use, however, is for the preparation of effervescing draughts, when added to the alkaline carbonates.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss.; its refrigerant effects are best manifested when it is dissolved in a large quantity of cold water. For the preparation of effervescing powders, the following are the proportions required:—gr. xx. of crystallized tartaric acid are saturated by gr. xxvij. of crystallized bicarbonate of potash, or gr. xxxiiiss. of crystallized carbonate of soda, or gr. xxij. of bicarbonate of soda, or gr. xvss. of hydrated sesquicarbonate of ammonia.

Pulveres Effervescentes Tartarizati, D. (Take of crystals of tartaric acid, ʒx.; bicarbonate of soda, ʒxj., *or*, bicarbonate of potash, ʒxiij. Reduce the acid and alkaline bicarbonates, separately, to a fine powder, and divide each into eighteen parts. The acid and alkaline powders should be kept in papers of different colours.) For preparing ordinary effervescing draughts.

Trochisci Acidi Tartarici, E. (Tartaric acid, ʒij.; pure sugar, ℥viij.; volatile oil of lemons, min. x.; pulverize the sugar and acid, add the oil, mix them thoroughly, and beat them with mucilage into a proper mass for making lozenges.) Commonly employed under the name of *acidulated drops* in mild sore throats and colds.

INCOMPATIBLES.—The alkalies; salts of potash, of lime, of mercury, and of lead; and the vegetable astringents.

CITRUS AURANTIUM FRUCTUS, D.—*The fruit of Citrus aurantium. The common sweet orange tree.* This tree is indigenous in many parts of Africa and Asia; and is cultivated extensively in the south of Europe, the Azores, and the West India Islands. It belongs to the Natural family *Aurantiaceæ*, and to the Linnæan class and order *Polyadelphia Polyandria.*

BOTANICAL CHARACTERS.—Stems, smooth, cylindrical, from 12 to 15 feet high; Leaves, oval, pointed, entire, shining, coriaceous, on elongated winged petioles; Flowers, large, white, axillary, 2-6 on a common peduncle, fragrant; Fruit, the well-known sweet orange.

The fruit of the orange is too well known to require description; the juice consists of citric and malic acids, citrate of lime, mucilage, albumen, sugar, and water.

THERAPEUTICAL EFFECTS.—The juice of the sweet orange is an agreeable refrigerant, calculated to allay thirst in febrile and inflammatory affections; it is particularly beneficial in diseases attended with much thirst, and in which it is important not to introduce a large quantity of fluid into the stomach or intestines, as in strangulated hernia, &c.

LIMONES, D. E. LIMONUM SUCCUS, D. L.—*Lemons (and Limes,* E.) *The fruit of Citrus limonum,* D. E., *and of Citrus medica,* E. *The juice of the fruit of Citrus limonum,* D. L. Natives of the same countries, and belonging to the same botanical classification as *Citrus aurantium.*

BOTANICAL CHARACTERS.—The lemon-tree attains a height of 10-15 feet; Leaves, oval, or oblong, usually toothed, petiolate; the petioles simply margined, not winged; Flowers, white, tinged with red; Fruit, ovoid, terminated with an elongated knob; containing an acid pulp.

PROPERTIES.—Lemons are too well known to need description; the juice consists of 1·77 per cent. of citric acid, 0·72 of gum, malic acid, and bitter extractive, and 97·51 of water. Lemons decay by keeping: Christison states that they are best preserved by packing them with newly-slaked lime in bottles or earthenware jars, the mouths of which are secured with corks and wax. The juice may be kept unchanged for years, by adding to it when expressed and strained a tenth part of spirit of wine, filtering, and preserving in well-stopped bottles.

THERAPEUTICAL EFFECTS.—Lemon-juice forms a useful and agreeable refrigerant, allaying thirst and diminishing preternatural heat in febrile and inflammatory diseases; it is also found particularly useful in hemorrhages of an acute character. The employment of lemon-juice as a remedy in the treatment of acute rheumatism was proposed some years since by Dr. G. O. Rees of London, and most of those who have tried it on his authority corroborate his statements of its efficacy. Under its influence the agonizing pain is stated to be very rapidly relieved, and the frequency of the pulse diminished in a marked degree. The form of rheumatism in which lemon-juice seems to produce the greatest benefit is the acute disease, when the small as well as the large joints are engaged, or the acute form of that variety which is ordinarily termed rheumatic gout. In my own experience, although I have seen excellent and speedy effects follow its administration in some cases, it has on the whole disappointed my expectations, chiefly from the uncertainty of its beneficial action; being as little to be depended on as most other specifics which have been proposed for this obstinate and tedious disease; and this opinion, propounded in a former edition of this work, further and more extended experience has fully ratified. Various theories have been proposed to explain the *modus operandi* of lemon-juice in rheumatic diseases, but none of them are at all satisfactory.

DOSE AND MODE OF ADMINISTRATION.—Lemon-juice is usually administered in the form of *lemonade*, which is prepared by adding the juice to about ten or twelve parts of boiling water, and sweetening with sugar to the taste; in acute rheumatism Dr. Rees gives from one to four fluid ounces in the twenty-four hours, but it has been administered in five or even six times this quantity. Lemon-juice is also much employed for the preparation of effervescing draughts with the alkaline carbonates: gr. xx. of the bicarbonate of potash require for saturation fʒiiiss. of lemon-juice; gr. xx. of the sesquicarbonate of soda, fʒivss.; and gr. xx. of the sesquicarbonate of ammonia, fʒvj.

Syrupus Limonum, L. E. ("Lemon-juice, strained, Oj.; sugar, ℔iiss.; rectified spirit, fʒiiss.; boil the juice for ten minutes and strain; add the sugar to it and dissolve, and as soon as the syrup is cold mix with it the spirit," L. "Lemon-juice, freed of impurities by subsidence and filtering, Oj.; sugar, ℔iiss.; dissolve the sugar in the lemon-juice with a gentle heat, and after 24 hours rest remove the scum, and pour the clear liquor from the dregs," E.) An excellent addition to refrigerant drinks; in febrile affections it may be given with barley water. This syrup must be kept in well-stopped bottles in a very cool place. Dose, f℥j. to f℥ij.

MORI SUCCUS, L.—*The juice of the fruit of Morus nigra.* The mulberry tree is a native of Persia, now cultivated in this country; it belongs to the Natural family *Urticaceæ* (*Moraceæ*, Lindley), and to the Linnæan class and order *Monœcia Tetrandria.*

BOTANICAL CHARACTERS.—A small tree with rugged bark; Leaves, cordate, lobed; Flowers, greenish, in small roundish catkins; Fruit, dark purple, "consisting of the female flowers, become fleshy and grown together, inclosing a dry membraneous pericarp," (Lindley).

PROPERTIES.—The fruit, commonly called mulberries, has a faint, agreeable odour, and an acidulous, sweetish taste. The juice contains tartaric acid, sugar, colouring matter, and water.

THERAPEUTICAL EFFECTS.—Mulberry juice is an agreeable refrigerant, but taken in quantity it is apt to produce diarrhœa. In the present day it is very seldom used, except as a colouring agent. The following is the only officinal preparation of mulberries:—

Syrupus Mori, L. (Juice of mulberries, strained, Oj.; sugar, ℔iiss.; rectified spirit, f℥iiss.; dissolve the sugar in the mulberry juice with a gentle heat; remove the scum and pour off the clear liquor from the dregs if there are any; finally mix in the spirit.) Used for the same purposes as the syrup of lemons; it has a fine purple colour, which is changed by acids and alkalies. Dose, f℥j. to f℥ij.

POTASSÆ CHLORAS, D. L.—*Chlorate of potash* (*in crystals*, L.)

PREPARATION.—An article of the Materia Medica in the Dublin and London Pharmacopœias. It is prepared on the large scale by transmitting chlorine gas to saturation through a strong solution of carbonate of potash.

PHYSICAL PROPERTIES.—In flat, pearly crystals, of the oblique prismatic system; inodorous, but having a cooling, unpleasant taste, like that of nitre. Specific gravity, 1·989.

CHEMICAL PROPERTIES.—Chlorate of potash is composed of one equivalent of potash, and one of chloric acid, $KO, Cl\,O^5$. It is permanent in the air; exposed to heat, it fuses and gives out oxygen below a red heat; if the heat be increased, all the oxygen is driven off, and chloride of potassium left. It is soluble in about 17 parts of cold water, and in once and a-half its weight of boiling water. This salt is readily known: by dropping a little sulphuric acid on the crystals they first become yellow, afterwards red, and give out the greenish-yellow gas,—peroxide of chlorine.

ADULTERATIONS.—The only impurity met with in chlorate of potash is chloride of potassium, and this arises from faulty preparation; it is readily detected by adding nitrate of silver to a solution of the salt in distilled water, if any chloride be present a white precipitate is thrown down. The following are the characteristics and tests given for it in the London Pharmacopœia:—"Soluble in water, nitrate of silver throwing down nothing from the solution; it melts by heat, and at a red heat 100 grains yield nearly 39 grains of oxygen ; a few drops of sulphuric acid being poured on the crystals, the salt is first turned yellow, then reddened, and exhales yellow vapours of peroxide of chlorine ; triturated with sulphur it crepitates."

THERAPEUTICAL EFFECTS.—Chlorate of potash in its action on the system resembles nitre ; by some it has been held to be diuretic, but its most manifest action is refrigerant. It was formerly employed in diseases which were supposed to depend on a deficiency of oxygen, as in phthisis and scurvy. More recently it has been proposed as a remedy in diseases attended with a deficiency of the saline constituents of the blood, as in malignant cholera, typhus fevers, &c. Almost the only disease, however, in which it is at present used in this country is in *cancrum oris*, or phagedenic ulceration of the cheek in children,—and in this affection it proves singularly beneficial; on the Continent, however, especially in France, it is prescribed in a number of diseases, particularly in those attended with unhealthy or gangrenous ulcerations.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xx. dissolved in water, and sweetened with syrup. The dose for children is from gr. iiss. to gr. v. according to the age, and in the disease above mentioned this quantity should be given every hour or at least every second hour.

POTASSÆ NITRAS.—*Nitrate of Potash* (described in the division *Diuretics*), operates as a refrigerant, sensibly diminishing preternatural heat in febrile and inflammatory affections; during its operation the force and frequency of the pulse are diminished also, and it has consequently been named a sedative-refrigerant. Towards the close of the last century nitre was given in large doses in the treatment of acute rheumatism, and this practice has been revived of late years first in Paris, and subsequently in England. So far as my own experience would lead me to judge, it is productive of the most beneficial results in many cases, but in some it fails to afford the least relief; and in all after the second or third day it causes great nausea and loathing. The manifest effects I have seen to follow its use are a great increase in the urinary secretion, and a diminution in the force and frequency of the pulse ; according to others it causes copious sweating and purging. The employment of nitre in hemorrhages, particularly hemoptysis, is attended with much benefit, which depends undoubtedly on the combined action above referred to. It proves very beneficial in the treatment of asthma, especially when dependent on disease of the heart. Nitrate of potash is contraindicated in inflammatory affections of the stomach, the intestinal canal, the kidneys or bladder, in consequence of its irritant properties which have been alluded to in a previous chapter. As an external application, nitre is employed to produce cold during its solution in water ; for this purpose it should be applied during the process of solution.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to gr. xx. mixed with sugar or dissolved in water. In the treatment of acute rheumatism it must, however, be given in *very large* doses, from four to six drachms in the course of the 24 hours, rapidly increased to eight, ten, or even twelve drachms. When thus prescribed it should be given dissolved in a large quantity of fluid; ʒj. in f℥viij. of gruel, barley-water or lemonade. *Nitre whey*, prepared by boiling ʒij. of nitre in Oj. of new milk and straining, is an excellent refrigerant drink in mild febrile diseases. Dose, f℥ij. to f℥iv. Where nitre is to be administered as a refrigerant dissolved in water, the effect is much increased if the solution is not made until just before being swallowed.

ROSA CANINA, FRUCTUS RECENS, L. ROSÆ FRUCTUS, E.—*The fruit of Rosa canina*, L. *The hip, deprived of the carpels, of Rosa canina, and of several allied species*, E. The dog-rose is a common indigenous shrub, belonging to the Natural family *Rosaceæ*, and to the Linnæan class and order *Icosandria Polygynia.*

BOTANICAL CHARACTERS.—Stem, with scattered, hooked prickles, which are dilated at the base; Leaves, naked or slightly hairy; Leaflets, with irregular serratures Flowers, rose-red; Fruit, scarlet.

PROPERTIES.—The fruit *(hip)* of the dog-rose consists of the fleshy calyx, inclosing numerous small carpels enveloped with hairs; it is of a bright scarlet colour, smooth and shining. The external coat alone is used in medicine; it should be carefully freed from the carpels and hairs. It has a sweetish acidulous taste, and is composed chiefly of uncrystallizable sugar, gum, citric, and malic acids.

THERAPEUTICAL EFFECTS.—The hip of the dog-rose is an agreeable refrigerant; it is only employed in medicine in the following preparation:—

Confectio Rosæ Caninæ, L. E. ("The dog-rose hip, deprived of its seeds, ℔j.; sugar, powdered, ℥xx.; rub the rose hip with the sugar gradually added until they are thoroughly incorporated," L. "Take any convenient quantity of hips carefully deprived of their carpels, beat them to a fine pulp, adding gradually thrice as much sugar," E.). Used only as a basis for forming more active remedies into pills or electuaries, and as it contains no tannin, it may be employed for this purpose with the salts of iron.

CHAPTER XVI.

SEDATIVES OR CONTRA-STIMULANTS.

(Calmatives.)

SEDATIVES are medicines which directly or primarily depress the vital powers, without inducing any subsequent excitement; from their action being the reverse of Stimulants, they have also been very generally termed CONTRA-STIMULANTS. This class of medical agents is usually confounded with *Narcotics;* and were we merely to theorize on their mode of action, it would be perhaps difficult to draw an exact line of distinction, but when we come to consider the remedial powers of the medicines classed under each head, it will, I think, be at once evident how *practically* essential it is that we should recognise this as a special class of remedial agents. The diseases in which sedatives are employed are those of over excitement of the nervous and vascular systems: some of the substances contained in the class, for example Hemlock, act directly on the nervous system; while others, as Digitalis, influence more immediately the circulation. It will be therefore necessary before prescribing for individual cases, to consider attentively the peculiar operation of the different sedatives. An important and practical rule to be borne in mind, with reference to the operation of contra-stimulants, is that the dose must be in general proportioned to the degree of excitement present; this *tolerance* of medicines is remarkably illustrated by the very large doses of tartar emetic which are administered not only with impunity, but with advantage, when inflammatory action runs high. To the remedies which have been ordinarily described as sedatives, the modern discoveries in medicine have made an important addition, namely, *Anæsthetics:* under this appellation are included certain vapours or gases, by the inhalation of which sensation and the power of the will are temporarily suspended. The vapour of sulphuric ether was at first employed to produce this effect, but its use has, in this country at least, been altogether superseded by chloroform since the discovery of Professor Simpson, of Edinburgh; and that of *Amylene,* now described in this book for the first time, though only employed very recently, is falling rapidly into disuse.

ACIDUM CARBONICUM. *Carbonic acid.* This gaseous acid, not officinal in any of the British Pharmacopœias, requires a short notice, in consequence of its use having been lately again revived as a sedative in the practice of medicine. During the last century it had been employed with that intention, and amongst others by Dr. Macbride, who practised in this city and contributed much at that time to medical literature.

The mode of preparation of carbonic acid gas and its chemical history are too generally described in the most elementary works on chemistry to need any notice here; and there can be no difficulty in devising an apparatus for its therapeutical application according to the special part of the body to which it is to be applied. It has been employed nearly if not altogether in the treatment of those painful diseases of females which affect the bladder and uterine organs, and it is said with much success. Dr. Churchill, in a memoir published in the Dublin Quarterly Journal of Medical Science, (vol. 24, page 227), narrates some cases in which he derived very decided benefit from the application of carbonic acid gas to the vagina in the irritable bladder attendant on or accompanying uterine diseases, as also in the obstinate vomiting of hysteria and of pregnancy.

ACIDUM HYDROCYANICUM DILUTUM, D. L. ACIDUM HYDROCYANICUM, E.—*Medicinal Hydrocyanic or Prussic acid. Hydrocyanic acid diluted with about fifty (thirty,* E.) *parts of water.* (Syn. *Acidum prussicum,* D.)

PREPARATION.—*Dublin.*—" Take of ferryocanide of potassium, two ounces; oil of vitriol of commerce, one fluid ounce; water, twelve ounces. Dissolve the salt in eight ounces of the water, and dilute the oil of vitriol with the remaining four ounces. When both solutions are cold, introduce them successively into a retort or matrass, containing several slips of platinum foil, and connected in the usual manner with a Liebig's condenser; and, with the aid of a gentle heat, let eight ounces be distilled over. Finally, dilute the product with eight ounces of distilled water, or so that the volume of the diluted acid shall be sixteen fluid ounces. The specific gravity of this acid is 997." *London.*—" Ferrocyanide of potassium, ℥ij.; sulphuric acid, fʒvij.; distilled water, Oiss.; mix the acid with f℥iv. of the water, and to these when cooled and put into a glass retort, add the ferrocyanide of potassium first dissolved in Oss. of water; pour fʒiij. of the water into a cooled receiver, then the retort being fitted on, let fʒvj. of acid pass into this water, distilled with a gentle heat in a sand-bath. Lastly, add fʒvj. more of distilled water, or as much as may be sufficient, that 12·59 grains of nitrate of silver dissolved in distilled water may be accurately saturated by 100 grains of this acid." The following additional process was also contained in the former edition of the London Pharmacopœia:—" Diluted hydrocyanic acid may be also prepared, when it is more immediately wanted, from gr. xlviiiss. of cyanide of silver, added to f℥j. of distilled water, mixed with gr. xxxixss. of hydrochloric acid. Shake all these in a well-stopped vial, and after a short interval pour off the clear liquor into another vessel. Keep this for use, the access of light being prevented." *Edinburgh.*—" Ferrocyanide of potassium, ℥iij.; sulphuric acid, f℥ij.; water, f℥xvj.; dissolve the salt in f℥xj. of the water, and put the solution into a matrass with a little sand; add the acid previously diluted with f℥v. of the water and cooled; connect the matrass with a refrigeratory; distil with a gentle heat, by means of a sand-bath or naked gas-flame till f℥xiv. pass over, or till the residuum begins to froth up; dilute the product with distilled water till it measures f℥xvj."

PHYSICAL PROPERTIES.—Medicinal hydrocyanic acid is a colourless liquid with a peculiar penetrating odour, and a bitter taste, leaving a warm sensation on the tongue and palate. The odour is generally stated to resemble that of the volatile oil or distilled water of bitter almonds, but it is decidedly different and should not be confounded with it. The specific gravity varies with the quantity of real or anhydrous acid contained in the medicinal preparation.

CHEMICAL PROPERTIES.—The dilute acid is a mixture of anhydrous hydrocyanic acid and water. The Dublin preparation contains 2 per cent., that of London is of the same strength, while that of Edinburgh is stronger, containing 3·3 per cent. ; the acid commonly sold in shops under the name of Scheele's acid varies in strength, usually containing about 4 per cent. Anhydrous hydrocyanic acid is composed of one equivalent of cyanogen, and 1 of hydrogen, H + Cy. The quantity of pure acid contained in the medicinal preparation may be readily ascertained, "by accurately weighing a portion of it, amounting to about 100 grains, adding to this portion nitrate of silver in excess, collecting the white insoluble precipitate of cyanide of silver which falls, on a weighed filter, drying and weighing together precipitate and filter : five parts of the precipitate correspond to one part of pure acid," (Graham.) Hydrocyanic acid reddens litmus paper feebly, and the red tint disappears by heat ; it is very volatile, and soon decomposes by keeping, a black precipitate being formed in it. For medical purposes, the dilute acid may be kept for a long time unchanged by the addition of some drops of sulphuric acid. The best test for the presence of this acid is its action on sulphate of iron; if a few drops of a solution of caustic potash be added to a fluid suspected to contain hydrocyanic acid, and then a solution of a mixed proto- and sesqui-salt of iron, as the common sulphate or tincture of the muriate of the shops, a greenish precipitate is produced, which becomes bright Prussian blue on the addition of a little sulphuric acid. Its presence is also indicated by adding a few drops of sulphuric acid to the liquid containing it, and covering the vessel with a glass plate, having its lower surface moistened with a solution of nitrate of silver ; owing to the volatility of the acid the surface of the plate will be covered with the white cyanide of silver.

ADULTERATIONS.—Medicinal prussic acid, as met with in the shops, varies much in strength, is often much contaminated with impurities, and is frequently unfit for use from having been too long kept. The strength is most conveniently ascertained by Professor Graham's test, given above, of course bearing in mind the difference in the preparations of the British Pharmacopœias. The presence of any fixed impurity is indicated by the solution not being entirely vaporizable by heat. The most common impurity met with is sulphuric or hydrochloric acid ; the presence of either may be suspected if the medicinal preparation acts strongly on litmus paper ; they may be easily detected by the test first proposed by Professor Geoghegan of this city : " Drop one or two crystals of the *hydrargyro-iodocyanide of potassium*[*] into the suspected acid; should any foreign acid be present, a red precipitate will immediately be formed on them." Concentrated distilled water of bitter almonds is sometimes substituted for prussic acid; the sophistication may be detected by placing a small quantity of the suspected liquid in an open phial in a sand-bath, and holding a piece of litmus paper over the mouth of the bottle; if it be bitter almond water no effect will be produced on the paper, but it will be reddened by the vapour of prussic acid. When unfit for use from being kept too long, prussic acid is generally, though not always, discoloured The following are the characteristics and tests given for dilute hydrocyanic acid in the last edition of the London Pharmacopœia:—Colourless; by heat it is driven off in vapours, exhaling a peculiar odour; it reddens litmus paper faintly, and the change of colour is not permanent; it does not become red on the addition of iodo-cyanide of potassium and mercury; chloride of barium added causes no precipitate; 100 grains of the dilute acid contain 2 grains of hydrocyanic acid."

THERAPEUTICAL EFFECTS.—Hydrocyanic acid is perhaps the most powerful poison which has been as yet discovered, "death having been occasioned in man by a mixture containing scarcely one grain of the anhydrous acid," (Christison.) The usual symptoms produced by a poisonous dose are convulsions, difficult and spasmodic breathing, and insensibility, followed by death in a few minutes; in some instances, however, life has been prolonged for half an hour or more; but if the quantity taken be very large, death occurs so rapidly that the only symptoms which can be observed are two or three deep hurried inspirations; in some instances, preceded it is stated, by a loud shriek,—this, however, is very doubtful. In medicinal doses hydrocyanic acid acts as a direct sedative, producing, immediately after it has been taken, a sensation of quiet and calmness throughout the whole system, diminishing the force and frequency of the pulse, lowering the sensibility of the nervous system, and allaying irritation when it exists; in addition to the above, which may be said to be its more immediate effects, it promotes the digestive powers, and in many instances acts gently on the bowels.

As a remedial agent, this acid has been principally used to allay irritability, to diminish pain, and to lessen spasm. Thus, it has been employed with much benefit in the excited action of the heart in pericarditis, in spasmodic and painful affections of the stomach and bowels, as in gastrodynia and enterodynia, in pyrosis, particularly when accompanied by much pain, in chronic vomiting, and in colica pictonum. It has been also found very serviceable in allaying irritable or spasmodic cough in various pulmonary affections, as in simple hooping cough unattended with inflammation, in pure spasmodic asthma, in the advanced stages of phthisis, and in the spasmodic cough of nervous and hysterical females. Hydrocyanic acid has been successfully employed to allay vomiting and purging in severe cases of common cholera, and to check the colliquative diarrhœa and sweating of hectic. Lastly, it has been administered as a calmative and anodyne in neuralgia, tic douloureux, chronic rheumatism, cancerous diseases, and nervous palpitations, but its success in these affections has been very equivocal.

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[*] "This salt may be readily prepared by adding a concentrated solution of bicyanide of mercury to a solution of iodide of potassium, when it is precipitated in the form of white or pearly crystalline plates."

Externally, applied in the form of lotion, it is found very serviceable in allaying the violent itching which attends many forms of skin diseases, but for this purpose is far inferior to chloroform. The vapour of prussic acid has been applied to the eye in amaurosis by Dr. Turnbull, but its efficacy is very doubtful; in a case which I saw with Mr. Wilde of this city, its employment for this purpose produced giddiness, temporary insensibility, and other symptoms of poisoning, followed by erysipelatous inflammation of the face and forehead.

DOSE AND MODE OF ADMINISTRATION.—The medicinal acid is administered in doses of one or two drops, which should be repeated every second or third hour according to circumstances, the effects being very transitory. It is best given in distilled water to which simple syrup may be added; it should be always prescribed in the form of draught, as when given in mixture it is apt to float on the top of the liquid, and thus a single dose may produce dangerous effects. The quantity given should be increased very gradully, and its effects carefully watched. For external use, a lotion may be prepared with fʒij. of the acid, and f℥viij. of distilled water.

INCOMPATIBLES.—Nitrate of silver; red oxide of mercury; sulphate of copper; sulphate and muriate of iron if an alkali be present; all sulphurets; and strychnia.

In cases of poisoning with prussic acid, if the person be seen immediately, he should be made to inhale ammonia diluted with atmospheric air, or the liquor ammonia should be administered in small but frequently repeated doses; the administration of chlorine gas has been also recommended, or when it cannot be obtained readily, a solution of the hypochlorite of lime or hypochlorite of soda; but if some time have elapsed, and insensibility be present, the most powerful external stimulants, with the cold affusion, and artificial respiration, should be employed. More recently the Messrs. Smith of Edinburgh have proposed a mixture of a proto and a persalt of iron combined with an alkaline carbonate, as an antidote for prussic acid; and from the experiments performed with it, its use appears to be attended with complete success. The method recommended by these gentlemen is as follows:—Dissolve gr. x. of sulphate of protoxide of iron in f℥j. of water, and add to it fʒj. of tincture of muriate of iron; and dissolve in another vessel gr. xx. of carbonate of potash in f℥j. or f℥ij. of water; the latter solution is to be administered first, and immediately afterwards the solution of iron. Of all the remedies, however, which have been proposed for the treatment of poisoning with hydrocyanic acid, none have been attended with the good results which have followed from the use of the cold affusion, or preferably the cold *douche* on the head only; and in several recorded cases, recovery has taken place even where this remedy had not been had recourse to for some time after the symptoms of poisoning had appeared.

ACONITUM NAPELLUS, RADIX, D. ACONITI FOLIUM ET RADIX, L. ACONITUM, E.—*Monkshood. The root (fresh and dried leaf and root,* L., *leaves,* E.) *of Aconitum napellus.* It has not been yet accurately ascertained which species of the genus *Aconitum* was employed by Störck, who was the first to use it as a medicine. The reference of the three British Pharmacopœias is not only correct, but, according to the accurate and trustworthy experiments of Professor Fleming, now of Birmingham, whose treatise on this plant is a model of the manner in which such an inquiry should be conducted, the aconite there indicated is the only European species possessed of any medicinal activity. It is said to grow wild in some parts of England, but it was probably introduced from the continent of Europe, where it grows abundantly in woods. It belongs to the Natural family *Ranunculaceæ,* and to the Linnæan class and order *Polyandria Trigynia.*

BOTANICAL CHARACTERS.—Root, tapering, with one or more pyriform tubers attached; Stems, simple, 2–6 feet high; Leaves, palmate, cuneate, pinnatisect; Flowers on a cylindrical simple raceme, deeply hairy, with an irregular petaloid calyx, the upper leaflet of which is helmet shaped.

MODE OF PREPARATION.—The root should be dug up immediately after the plant flowers, and the tubers alone employed; they must be cut into thin slices, and dried slowly at a low temperature; the leaves should be gathered just before the flowers expand, and dried carefully with a stove heat.

PHYSICAL PROPERTIES.—Aconite root has a faint earthy odour and bitter acrid taste, leaving a benumbing impression on the lips and tongue; it is the most active part of the plant. The leaves have a very feeble narcotic odour; their taste is similar to that of the root. When carefully dried, they retain their virtues for many years, if kept in close vessels in a dry place excluded from the light.

CHEMICAL PROPERTIES.—No very accurate chemical analysis has been made of this plant. It contains an acrid volatile principle, green colouring matter, vegetable albumen, some salts, and a peculiar alkaloid, first discovered by Brandes, and named by him *aconitina,* in combination with a peculiar acid, *aconitic acid,* indicated by Peschier, and said to be identical with Equisetic acid. Aconitina was officinal in the London Pharmacopœia of 1836, but as it could with difficulty if at all be procured by the process there given, it has been omitted from the last edition; and is now either prepared by a few celebrated pharmaceutical chemists in these countries, or imported from France or Germany. Its properties, &c., will be described among the preparations of the drug. Aconite leaves and root yield their active principles completely to alcohol, but very imperfectly to water.

ADULTERATIONS.—The leaf of other species being occasionally substituted for that of the Aconitum napellus, the London College has given the following characteristics for it:—"Glabrous, 5 partite, the lobes cuneate, pinnatisect."

THERAPEUTICAL EFFECTS.—In large doses the leaves or root of aconite are highly poisonous, appearing to produce death by a direct depression of the vital powers: thus, the most manifest symptoms are slight wandering delirium, the consciousness being partly retained, general muscular tremors or very slight convulsions, and failure of the circulation; moreover a feeling of numbness and tingling is experienced over the entire of the body, a diminution of the temperature of the surface takes place, and there is frequently loss of sight—the pupil of the eye which was at first contracted becoming dilated, and death by *syncope* taking place. In addition to these, in some carefully conducted experiments on the lower animals, Von Praag discovered a retarding influence on the respiration, and a paralysing operation on the voluntary muscles; which quite agree with its effects on man in poisonous doses. As a medicine it has been used with the most marked benefit in all forms of painful diseases, even when accompanied by inflammation; this is well illustrated by its employment in the treatment of acute rheumatism, and of neuralgia. In the former of these diseases it has proved in the hands of Dr. Lombard of Geneva a complete specific, and his statements have been fully borne out by the experience of Dr. Fleming in his carefully conducted investigations; the alcoholic extract given in doses of from half a grain to eight grains frequently repeated, curing the severest attacks of febrile rheumatism, in from two to six days, and affording marked relief within an hour or two after the first dose is taken. It has not, however, proved so successful in the practice of other British physicians, which is probably owing to the inertness of the officinal extract of the London Pharmacopœia:—for in some cases in which I employed the powdered leaves, the beneficial results were most marked. I have administered the tincture with decided benefit in painful affections of the stomach, whether dependent on organic disease or not; and in some obstinate cases of violent gastrodynia, which had resisted all other remedies for years, its effects were most decided, perfect recovery resulting in a short time from its use. In neuralgic pains, particularly tic douloureux, applied externally in the form of extract or tincture, it seldom fails to ameliorate the suffering, and in many instances will cure the disease, but it is not so useful in sciatica or lumbago. It has been also administered in the treatment of many other diseases, but in none of them has its efficacy been well established. Aconitina has been used in the same cases as the preparations of the leaves or root of aconite, but owing to its high price and its intensely poisonous properties, it has hitherto been but little employed.

DOSE AND MODE OF ADMINISTRATION.—The powder of the root or leaves may be given in doses of from gr. iij. to gr. xij. gradually increased, until symptoms indicating its action are produced.

Extractum Aconiti, L. E. ("Fresh aconite leaves, ℔j.; bruise them in a stone mortar, then press out the juice and evaporate it unstrained to a proper consistence," L. "Take of fresh leaves of monkshood any convenient quantity, beat them into a pulp, express the juice, subject the residue to percolation with rectified spirit, so long as the spirit passes materially coloured; unite the expressed juice and the spirituous infusion; filter, distil off the spirit, evaporate the residue in the vapour-bath, taking care to remove the vessel from the heat so soon as the due degree of consistence shall be attained," E.) As aconite leaves yield their active principles almost entirely to alcohol, and but very partially to water, the Edinburgh preparation only can be active. The dose of it is gr. ij. to gr. viij. repeatedly.

Extractum Alcoholicum Aconiti, FLEMING. (Prepared by distilling off the spirit from the tincture, at a low temperature, until the consistence of an extract is obtained. The process should be completed in a vapour-bath.) Its colour is dark-brown or almost black; it has an agreeable smell and a bitter taste. Dose, one-third of a grain thrice daily, commencing with one sixth of a grain.

Unguentum Aconiti, (The alcoholic extract, 1 part; prepared lard, 2 parts; mix.) An excellent application rubbed over the painful part in neuralgia.

Tinctura radicis Aconiti, D. *Tinctura Aconiti*, L. ("Take of aconite root, dried, and cut small, ℥x.; rectified spirit, Oj.; macerate for fourteen days, strain, express, and filter," D. "Aconite root, coarsely powdered, ℥xv.; rectified spirit, Oij.; macerate for seven days, express and strain," L.) Dose, min. viij. three times a day, increased by one minim daily until its effects are produced. The London preparation is a fourth weaker, therefore its dose is min. x. A stronger tincture, and that which has been in general use until the publication of the last edition of the Dublin Pharmacopœia, is prepared by the following process of Dr. Fleming:—"Take of the tubers of Aconitum napellus, carefully dried and finely powdered, ℥xvj. (Troy); rectified spirit, f℥xvj.; macerate for four days, then pack into a percolator; and add rectified spirit until f℥xxiv. of tincture are obtained." This tincture is beautifully transparent, of the colour of sherry wine, and has a slightly bitter taste. Dose, min. v. three times a day. The strength of this preparation compared with that of the Dublin College is about 3 to 2. Any of these tinctures should be used with caution: the strong tincture is the best form for external use, when aconitina cannot be procured, and this is an important advantage which Dr. Fleming's tincture possesses, namely, that it answers for both purposes, while that of the Dublin Pharmacopœia, and consequently that of the London, is too weak for external application, and there can be no more danger in giving internally a small dose of a strong tincture than a larger dose of a weak one; Dr.

Fleming's tincture is also of a more uniform strength, inasmuch as the quantity of the root employed being in excess, the spirit is always fully saturated.

Aconitina is in the form of a white semi-crystalline powder, odourless, with a bitter taste. Its composition is stated to be $C^{60} H^{47} NO^{14}$? It is very soluble in sulphuric ether, less so in alcohol, and very slightly soluble in water. When perfectly pure, this alkaloid is so powerful a poison, "that a fiftieth of a grain has endangered the life of an individual," (Pereira.) As usually met with it is of a grayish yellow colour, in which state it is very impure. Aconitina possessses, but of course much more powerfully, the same medical virtues as monkshood; it has been principally used in the form of ointment in tic douloureux, and other neuralgic pains. But it does not appear to possess sufficient advantages over the alcoholic extract, (considering its enormous price), to warrant its employment as a medicinal agent. It cannot be administered internally with safety.

Solutio Aconitinæ, TURNBULL. (Aconitina, gr. viij.; rectified spirit, fʒij.; dissolve.) Applied externally by means of a small sponge.

Unguentum Aconitinæ, FLEMING. (Aconitina, gr. xvj.; rectified spirit, min. xvj.; rub well together, and add of axunge, ℥j.; mix.) Employed by friction with the finger during several minutes. If there be any abrasion of the cuticle, the external application of aconitina cannot be unattended with danger.

In cases of poisoning with monkshood, emetics should be immediately administered, and the most active stimulants, both external and internal, employed. Tannin has been recommended as an antidote, in consequence of its forming insoluble compounds with the vegetable alkaloids; but most of the insoluble tannates are digestible in the human stomach.

AMYGDALÆ AMARÆ OLEUM.—*Volatile oil of bitter almonds.* The bitter-almond tree has been described in the division *Emollients.*

PREPARATION.—Oil of bitter almonds is obtained by submitting bitter-almond cake, left after the separation of the fixed oil by expression, to distillation with water.

PHYSICAL PROPERTIES.—As usually met with it is of a golden-yellow colour, but when obtained from almonds which have been blanched, is colourless when first drawn. It is a transparent liquid with a high refractive power, having an agreeable *ratafia* odour, and an acrid, warm, bitter taste. Bitter almond oil is heavier than water, its specific gravity varying from 1·053 to 1·083.

CHEMICAL PROPERTIES.—Oil of bitter-almonds, as prepared by distillation, consists of from 8·5 to 14·33 per cent. of pure hydrocyanic acid, mixed with *benzoïc acid*, *benzoïn*, *benzimide*, and *hyduret of benzoyle.* Its poisonous and medical properties depend chiefly on the hydrocyanic acid, which may be completely removed from it by repeated distillation from a solution of caustic potash, but hyduret of benzoyle which is left is still a poison though not so active a one, and moreover does not keep well, as it rapidly undergoes oxidation. The oil is very soluble in alcohol and ether; by agitation with water, a portion of the hydrocyanic acid is dissolved out, and the water acquires the peculiar odour and taste of the acid.

ADULTERATIONS.—Oil of bitter almonds has been recently much adulterated, but chiefly on the continent. According to Zeller, the best tests for its purity are its high specific gravity, and its *clear* solubility in sulphuric acid, with a reddish-brown coloration, and without any visible decomposition.

THERAPEUTICAL EFFECTS.—The medical properties of this oil depending on the hydrocyanic acid it contains, its effects and uses are of course similar to those of that acid, for which it has been proposed as a substitute; but its strength being very variable, it is scarcely adapted for internal use. It should be borne in mind that the oil of bitter almonds is at least four times as active as officinal prussic acid.

DOSE AND MODE OF ADMINISTRATION.—Min. ij. may be dissolved in fʒss. of rectified spirit, and of this solution min. iij. to min. vj. may be given occasionally.

Vegetable Hydrocyanic Acid, SCHREDER. (Oil of bitter almonds, min. iv.; rectified spirit; and distilled water, of each, min. xxx.; dissolve.) Dose, min. ij. to min. iij. every second or third hour.

AMYLENA. *Amylene.* Among the many substitutes possessing anæsthetic properties proposed for use in medicine instead of ether or chloroform, this alone deserves notice, as having been used for some time pretty extensively, and being still employed in practice by some surgeons. It was originally discovered in 1844 by M. Balard of Paris, but had not been used in medicine until within the last few years, when it was first employed as an anæsthetic in surgical operations by Dr. Snow of London. Amylene is procured by distilling Fusel oil (see page 46) with chloride of zinc. The following process is at present generally followed for its preparation:

PREPARATION.—A certain quantity of pure fusel oil—not more than sufficient to half fill the vessel—is put into the body of a copper still, and about a sixth of its weight of solid chloride of zinc, in small fragments, added; the chloride of zinc should have been moistened with fusel oil previously by being submerged in it for three days. The head of the still being carefully adapted, a large glass tube is closely luted to the orifice, and heat applied by means of a sand-bath. At a temperature of 226° F. it begins to distil, and the product thus obtained is redistilled, the heat being continued until the temperature of the boiling liquid reaches 570° F. The most volatile parts of the fluid procured by this redistillation are agitated with concentrated sulphuric acid, when a colourless and very mobile liquid rises to the surface, and this constitutes the amylene of commerce.

PHYSICAL PROPERTIES.—Amylene is a transparent colourless, volatile liquid, much lighter than water; its specific gravity at

60° F. being 0·660. It has to most persons a disagreeable nauseous odour, resembling a mixture of ether and decaying cabbage; its taste is somewhat spirituous and faintly acrid.

CHEMICAL PROPERTIES.—It is a carburet of hydrogen, its composition being $C^{10} H^{10}$. It is very sparingly soluble in water, but dissolves freely in alcohol and ether; its boiling point is 102° F. and it is inflammable, burning with a brilliant white flame.

ADULTERATIONS.—Amylene as met with in the shops varies extremely in odour and properties, which is chiefly due to errors or carelessness in its preparation; other hydro-carbons, more particularly *paramylene*—the amylene of M. Cahours discovered five years previously—which distil over with it not being separated. The following, according to M. Duroy, are the best tests for its purity:—"The boiling point at 102° F.; to produce no action on potassium plunged into it; not to be coloured by caustic potash; and not to emit the odour of valerianic acid when heated in contact with hydrated potash."

THERAPEUTICAL USES.—For some time after the introduction of amylene as an anæsthetic agent by Dr. Snow it was believed that it would prove a useful substitute for chloroform, being supposed to be capable of producing insensibility to pain with much less coma or stupor than occurs from the use of either it or ether. This is certainly true, but subsequent experience has shown that its operation is uncertain, and moreover that its employment is not, as was at first stated, free from danger, as some deaths have taken place from its inhalation. Other objections to the employment of amylene also exist, namely its disagreeable odour, the anæsthetic state caused by it being of short duration, and the greater quantity required to be used of it than of chloroform. On the other hand again it is said not to irritate the air-passages—a statement which my own personal experience compels me to deny—nor to induce nausea or vomiting, as chloroform inhalation so usually does. On the whole, however, I am of opinion that as an anæsthetic agent amylene does not possess sufficient advantages over either chloroform or ether to entitle it to be generally employed for the purpose of producing insensibility to pain.

MODE OF EMPLOYMENT.—Amylene should not be administered without an inhaler. To produce anæsthesia it should be inhaled at the rate of rather more than a fluid drachm a minute, when, according to Dr. Snow, it will usually cause insensibility in three minutes.

ANTIMONIUM TARTARIZATUM.—*Tartar emetic* (described in the division *Diaphoretics*), when administered in full doses frequently repeated, acts as a direct *sedative* or *contra-stimulant*, this effect being most manifest in inflammatory diseases. Under the influence of doses of one, two, or three grains repeated every hour, or every second hour, the nausea, vomiting, or purging produced by the first or second dose ceases entirely, the force and frequency of the heart's action are lowered, and local inflammation is arrested. In Lepelletier's essay, two cases of pneumonia are mentioned, in one of which the pulse was reduced from 120 to 34 beats per minute in nine days, and in the other from 72 to 44 beats per minute in three days, under the use of continued doses of tartar emetic. This contra-stimulant power of tartar emetic is employed with benefit in the treatment of acute inflammations, in which it is administered either alone or as an adjunct to bleeding or other antiphlogistic means. The diseases in which this plan of treatment has been found most beneficial are acute pneumonia and pleuritis British practitioners usually employ local bleeding in these diseases, in conjunction with tartar emetic; but, although in pleuritis the combined local abstraction of blood will in some instances be absolutely requisite, it is stated by those who adopt this plan of treatment that many cases of pneumonia are cured as speedily and as effectually by the use of tartar emetic alone; indeed, by many physicians bleeding in considered singularly injurious to the development of the sedative influence of this medicine. This mode of administering tartar emetic has been also employed in the treatment of bronchitis, of arachnitis, and of many other acute inflammations, but in none of them are its beneficial effects decidedly manifest. As a contra-stimulant, tartar emetic is given in doses of from half a-grain to two grains every hour or every second hour, dissolved in a small quantity of water—one or two ounces at most; the best vehicle for its administration is perhaps orange-flower water. The first dose or two should not exceed half a-grain, and the patient should not be permitted to drink, so as if possible to avoid the production of vomiting: when once a tolerance of the medicine is produced in the system, the quantity taken may be rapidly increased.

CHLOROFORMUM, D. CHLOROFORMYL, L.—*Chloroform. Terchloride of Formyl.* Chloroform was originally obtained in 1831 by M. Soubeiran, and shortly afterwards discovered also by Liebig, but its composition and chemical characteristics were for the first time carefully investigated by Dumas in 1835. Many processes have been proposed for its preparation; the following are those contained in the last editions of the Dublin and London Pharmacopœias:—

PREPARATION.—"Take of chlorinated lime, ℔iv.; fresh-burned lime, ℔v.; water, cong. iv.; rectified spirit, f℥xxv.; peroxide of manganese, in fine power, ʒij. Slake the lime with a quart of the water, first raised to the boiling temperature, and having placed the slaked lime and the chlorinated lime in a sheet-iron or copper still, pour on the residue of the water first mixed with the spirit, and raised to the temperature of 100°. Connect now the still with a condenser, and apply heat, which, however, must be withdrawn the moment the distillation commences. The distilled product, the bulk of which need not exceed a quart, will occur in two distinct strata, the lower of which is the crude chloroform. Let this be agitated twice in succession, with an equal volume of distilled water, and then in a separate bottle with half its volume of pure sulphuric acid. Lastly let it be shaken in a matrass with the peroxide of manganese, and rectified from off this at a very gentle heat. The specific gravity of chloroform is 1496. The lighter liquid which distils over with the chloroform, and the water used in washing the latter, should be preserved with the view of their being introduced, with a new charge, into the still in a subsequent process," D. "Chlorinated lime, ℔iv.; rectified spirit, Oss.; water, Ox.; chloride of calcium, broken into small pieces, ʒj.; put the lime previously mixed with the water into a retort, and to these add the spirit, so that the mixture shall fill a third part only of the retort. Then heat it on a sand-bath, and as soon as the ebullition commences, remove it as quickly as possible from the fire, lest it should be broken by the suddenly increasing heat. Let the liquid distil into the receiver so long as nothing subsides from it, the fire being reapplied if necessary. To the distilled liquor add four times its quantity of water and shake them well together. Separate carefully the heavier portion which subsides, add to it the chloride, and shake them together frequently for an hour. Finally let the liquid distil again from a glass retort into a glass receiver," L.

PHYSICAL PROPERTIES.—Chloroform is a transparent, colourless, very mobile liquid, heavier than water, extremely volatile, with a sweetish cooling taste and an ethereal odour which is agreeably fragrant when the preparation is quite pure. The specific gravity of it when prepared according to the Dublin process is 1496, and according to that of the London Pharmacopœia not less than 1480; but the late Professor Gregory of Edinburgh stated that he obtained it so high as 1500.

CHEMICAL PROPERTIES.—It is a compound of two equivalents of carbon, one of hydrogen, and three of chlorine, its formula being $C^2 H Cl^3$. It is nearly insoluble in water, requiring 2000 parts for its solution, to which, however, it imparts its agreeable odour; but is soluble in alcohol and ether. Chloroform boils at 141°, is scarcely inflammable, kindling with difficulty, when it burns with a greenish flame. Concentrated sulphuric acid when agitated with chloroform has no action on it, and is therefore made use of for its purification in the process of the Dublin Pharmacopœia, as originally proposed by Gregory; but as pointed out by Christison, chloroform when thus treated, although at first unaltered, does not keep for any time, undergoing decomposition and evolving chlorine and sulphurous acid when its employment in medicine would be attended with danger. Chloroform should therefore be always purified by agitation with water and distillation, as directed by the London College.

ADULTERATIONS.—A great deal of spurious and badly prepared chloroform has been and still is met with in the shops; as a consequence perhaps of which, some of the fatal results which have followed its use have occurred, and its general employment as an anæsthetic agent has been retarded. When pure it is *perfectly* transparent; it should be of the prescribed density, should have no effect on litmus or turmeric paper, and should leave no *after-odour* when a small quantity is allowed to evaporate on the palm of the hand. The following is Professor Gregory's test for ascertaining the purity of chloroform:—"Perfectly *colourless* sulphuric acid, of the density of 1840 at least, when agitated with pure chloroform remains colourless, but if the chloroform be impure it becomes yellow or brown." For the detection of ether—a very frequent adulteration, M. Rabourdin of Orleans has proposed the following simple test :—" Pure chloroform dissolves a small quantity of iodine, acquiring a very beautiful violet colour, precisely resembling in tint the vapour of iodine ; but if the chloroform is mixed with sulphuric ether even in small quantity, the colour is wine red, or even dark brown if the ether is in any quantity." The presence of alcohol, also used to adulterate chloroform, may be detected by dropping it into water ; if pure, it falls to the bottom in a limpid transparent globule, but if it contains spirit the drop becomes opaline.

THERAPEUTICAL EFFECTS.—From the time of its original discovery chloroform had been more or less used on the continent and in America in the fluid form as a sedative, but was very little employed in this country. The chief diseases in which it had been administered with benefit were asthma, spasmodic cough, and cancerous and other painful affections ; in cancer it is most highly praised by Mr. Tuson of London, but general experience has not confirmed his extravagant statements. More lately it has been given with excellent effect in obstinate vomiting, in painful affections of the digestive organs, especially the various forms of colic, and in nervous and spasmodic diseases, such as hysteria, tetanus, hydrophobia, delirium tremens, in most of which affections I have prescribed it with decided benefit ; it has been also employed in the treatment of spasmodic cholera. Externally applied it allays pain and local irritation, and therefore constitutes a useful addition to liniments or ointments in neuralgia, muscular rheumatism, and cutaneous diseases attended with itching, especially prurigo, chronic eczema, urticaria, and lichen.*

But it is from its effects when inhaled in the form of vapour, that chloroform has become so important a therapeutical agent. Towards the close of the year 1846 the discovery was made in the United States of America, that a state of partial coma with insensibility to pain could be produced by the inhalation of the vapour of sulphuric ether, and this discovery was rapidly taken advantage of, for the purpose of preventing any suffering to the patient during surgical operations. It was almost immediately found, however, that ether inhalation was very uncertain in its effects, producing in many persons violent excitement, spasmodic action of the muscles, and delirium, and in some instances death even followed its employment ; the attention of the members of the profession in all parts of the world was therefore at once actively engaged with the view of discovering a safe and effectual substitute for it ; the honor of this, one of the most important discoveries of modern times, fell to the lot of Professor Simpson of Edinburgh, who in November, 1847, ascertained that chloroform possessed the desired properties.

The vapour of chloroform when inhaled in quantity not exceeding that evolved by half a drachm, produces a feeling of fulness in the head, dizziness, and partial loss of consciousness, with usually pleasurable sensations: the effects vary according to individual temperament, but in all they more or less resemble semi-intoxication. If the quantity inhaled be augmented, total insensibility is quickly produced, usually in from thirty seconds to two minutes, the insensibility being marked by slight stertorous breathing, muscular relaxation, and fixing of the eyes. If the inhalation be now stopped, perfect consciousness will be restored, usually in from five to six minutes, the individual recovering without any remembrance of what had taken place. The circulation is somewhat affected during the state of anæsthesia, the strength of the pulse being generally diminished while its frequency is increased. The anæsthetic condition may be kept up for hours with impunity, as is often done in child-birth, by a cautious continued use of the inhalation.

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* See the Author's Treatise on Diseases of the Skin.

The therapeutical applications of the inhalation of chloroform are sufficiently manifest, its effects being so fully explained above ; but the two purposes for which it is specially used require to be shortly noticed, namely, the prevention of pain during surgical operations and in child-birth. At first, much opposition was given to the employment of anæsthetic agents for the induction of insensibility during operations, and the occurrence of an occasional fatal case even where chloroform has been inhaled with all due precautions still affords its opponents an argument against its use ; but the magnitude of the boon conferred is so great, and the proportionate risk of ill effect so small, that it is now used almost universally by surgeons, and by some even in the most trivial operations. There is one class of operations—the reduction of dislocations, in which it not only prevents pain, but by its relaxing effect on the muscular system removes all difficulty in the reduction, so that the complicated apparatus of compound pulleys, &c., is no longer required. In the reduction of strangulated hernia, and in the introduction of a catheter in spasmodic stricture, its relaxing effects are also especially advantageous. In operations about the mouth and nose only, is the production of anæsthesia contraindicated, and this depends on the danger that might result from the flow of blood into the air passages during the insensible state of the patient.

It is, however, to the use of chloroform during child-bearing that most opposition has been given, and a fierce controversy has raged between obstetrical practitioners on the subject, since it was first employed by Professor Simpson : scripture authority even being brought to bear on both sides of the question. But as I am not myself a practitioner in midwifery, and consequently cannot speak from personal experience, I wish merely to deal with facts. In Edinburgh anæsthesia is induced—to speak in general terms—in *every case* of labour, natural or preternatural, and with safety to both mother and child ; while the opinion of the majority of accoucheurs in this and most other large cities, as far as I can judge from what has been written on the subject, is well expressed in the following extract from the third edition of Dr. Churchill's Midwifery* :—"As to its exhibition in *natural labour*, as I do not believe that in the large majority of cases convalescence is at all impeded by the suffering, I cannot see the necessity or even the propriety of urging the employment of anæsthesia in every case; and I do feel that even greater caution ought to be used than in operative midwifery. We may be justified in running some risk when an important point is to be gained, such as perfect quietness during an operation, which we should not be justified in incurring merely to relieve pain; thus, in hysterical or nervous patients, in those labouring under nervous affections or organic diseases of the lungs or heart, &c., I do not think we ought to employ it." It is right, however, to add, that in no instance has a fatal result followed the inhalation of chloroform in midwifery practice.

In conclusion, anæsthesia has been employed with most favourable results in the treatment of tetanus, delirium tremens, hysteria, chorea, neuralgic affections, &c; it has also been had recourse to in hydrophobia, but although the spasms and suffering are thereby alleviated, no decided impression is made on the fatal progress of the disease. In a case of hay asthma I have seen the access of the attack kept off by constantly smelling chloroform, which the patient carried about with him for the purpose.

DOSE AND MODE OF ADMINISTRATION.—Internally in the fluid form, min. v. to min. xxx. suspended in water by means of mucilage of gum acacia or gum tragacanth, or of Irish moss as proposed by Professor Osborne, but which does not answer as well as either of the gums; in consequence, however, of the volatility of chloroform, it should be always prescribed in draughts: for external use fʒj. to fʒiv. may be mixed by means of yolk of egg with half a pint of any liniment, or from min. v. to fʒss. added to ℥j. of an ointment.

Anæsthesia is usually produced by the inhalation of the vapour produced by from fʒj. to fʒij. It is most effectually and safely administered in the manner first proposed by Professor Simpson: namely, by pouring the chloroform into the hollow of a handkerchief folded in the form of an inverted cone; at first fʒss. only should be used, and if the desired effect be not produced in about two minutes, the same quantity may be renewed. Various forms of *inhalers* have been proposed for the administration of the vapour of chloroform, but I must confess that I prefer the simple handkerchief. The chief points to be attended to are:—1st, that the patient should be lying on his back with the head slightly raised; 2nd, that he should be permitted at first to breathe atmospheric air mixed with the chloroform, which is effected by not bringing the handkerchief too close to the mouth and nose at once; 3rd, that the vapour should be altogether withdrawn as soon as insensibility is produced, which is usually evidenced by the occurrence of slight stertorous breathing, for this condition can be kept up for any length of time that may be requisite, by the occasional reapplication of fresh chloroform on the handkerchief; 4th, the patient's stomach should be empty when the inhalation is commenced, as otherwise vomiting is apt to be produced; and 5th, should fainting or other evidence of sinking occur, the best restorative is atmospheric air, or oxygen gas if possible, ammonia also may be applied to the nostrils, the cold douche on the head used, galvanism or electricity employed, or artificial respiration, by the direct application of the mouth of the operator to that of the patient, may be had recourse to, *but no stimulants should be given by the mouth.* There is but one other remark which I have to make to those inexperienced in the use of chloroform, namely, that during the process of inhalation, just before insensibility is produced, there is usually a struggle on the part of the patient; *this must be resisted, and the charged handkerchief kept just at that time closely applied to the mouth and nostrils.* In surgical operations as a ready means of ascertaining when the patient is sufficiently insensible to permit an operation to be commenced, Dr. Snow employs as a test, touching the ciliary edge of the eyelids, and when this does not occasion winking, then the insensibility is sufficient.

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* Page 220.

In the United States of America, a mixture of three parts of ether, and one part of chloroform, is ordinarily employed to produce anæsthesia, which it is stated to do effectually and without risk; and M. Bourguignon has recently proposed to substitute the vapour of ether for that of chloroform to keep up the state of insensibility as soon as anæsthesia is produced by the latter.

Dr. Hardy of this city has proposed the direct application of the vapour of chloroform in painful affections, especially those of the uterine organs, from its use in which he has seen much benefit result; for this purpose he has invented an ingenious but simple instrument. (See Dublin Quarterly Medical Journal, vol. xvi., page 306.)

CONIUM, L. E. CONIUM MACULATUM, FOLIA, D.—*Hemlock. The leaves (fresh and dried of the uncultivated herb,* L.) *of Conium maculatum.* Indigenous; belonging to the Natural family *Umbelliferæ* (*Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Biennial; Root, fusiform, whitish, 6–12 inches long; Stem 2–6 feet high, striated and spotted with purple, smooth, glaucous, hollow, much branched upwards; Leaves, large, tripinnate; Leaflets, lanceolate, pinnatifid with acute and often-cut segments; Flowers, white, in umbels of many general as well as partial rays; *General involucre* usually 3–7 leaflets; *Partial involucre* of 3 leaflets on one side; Fruit, ovate, compressed laterally, with five primary undulato-crenate ridges. The whole plant, when bruised, emits a peculiar fetid odour resembling the smell of mice.

PREPARATION.—The leaves are officinal in the three British Pharmacopœias; they should be gathered when the plant is in full flower, the stalks carefully picked out, and the leafy part dried with a stove heat, excluded from the light. For medicinal purposes they should be kept in well-stopped opaque bottles or jars, but as they lose much of their virtues by keeping, the druggist's stock should be renewed every year. The fruit may be collected when fully ripe, it is more active than the leaves and preserves its medical powers for a much longer period, yet it is not contained in any of the British Pharmacopœias.

PHYSICAL PROPERTIES.—Hemlock leaves in the fresh state are of a glaucous-green colour, and possess remarkably the characteristic odour of the plant; by drying they acquire a dull greyish-green colour, and lose much of their odour. They have a nauseous bitter taste. The fruit has a weaker odour, its taste is bitter, and somewhat acrid.

CHEMICAL PROPERTIES.—Hemlock leaves and fruit contain a peculiar alkaloid which has been named *conia (coneïn,* or *conicin),* a volatile odorous principle, albumen, resin, colouring matter, and some salts. The active principle of the plant is the alkaloid *conia;* this is a colourless oily liquid, lighter than water, its density being 0·89, with a peculiar, penetrating, very disagreeable odour, and an intensely acrid taste; it boils at 338° F.; is very inflammable; is soluble in 100 parts of water, and in 6 of ether, and mixes with alcohol in all proportions. *Conia* is nearly as active a poison as pure prussic acid. The alkaloid and its salts in solution are changed to a brown colour on exposure to the air. It is obtained by the distillation of the leaves or fruit with a caustic alkali, existing in the greatest quantity in the full-grown green fruit, eight pounds yielding half-an-ounce of *hydrated conia* (Christison.) The following is the process of the Hanoverian Pharmacopœia for its preparation:—"Hemlock seeds, bruised, ℔iv. ℥vij. gr. xxxviij.; water, Oxxviss.; slaked lime, ℔ij.¼; carbonate of potash, ℔j. ℥ij.; mix well and distil as long as the water which passes over has an odour of conia; saturate then with sulphuric acid and evaporate to the consistence of a syrup. Treat the residue with a mixture of one part of ether and two of alcohol, decant and add water to the residue in small quantity: apply the gentle heat of a water-bath, until all the spirit is removed. Then treat the liquor with about half its weight of a ley of caustic potash and distil to dryness. Add to the residue an additional quantity of the ley and distil anew, repeating the process until the fluid which distils over has no longer an odour of conia. The conia now separates from the water and is sufficiently pure for use in medicine." The composition of this alkaloid is $C^{16} H^{1} N^{5}$. It combines with acids to form salts which are crystalline and soluble in water. On triturating the leaves or fruit of hemlock with caustic potash, the peculiar odour of *conia*, which should not be confounded with that of the plant, is emitted; and as the medical virtues depend on the presence of this alkaloid, a ready test is thus afforded of ascertaining the goodness of any of the preparations of hemlock. The leaves and fruit yield their active properties to water, alcohol, oils, and fats.

ADULTERATIONS.—Other umbelliferous plants which bear a general resemblance to hemlock are frequently confounded with it, and their leaves often sold for those of the true plant. The distinguishing botanical characteristics of the plant are, its smooth purple-spotted stem, and its unilateral partial involucre; the fruit is readily known by its undulato-crenate primary ridges. Chemically, all parts of the plant are recognised by the peculiar odour of conia evolved on trituration with caustic potash ; and this test, as before remarked, is also applicable for ascertaining the quality of the officinal preparations of hemlock.

THERAPEUTICAL EFFECTS.—From the investigations which have been made of late years as to the action of hemlock, particularly those of Professor Christison and Mr. Judd, it would appear that its influence is chiefly exerted on the nerves of motion, and that its medicinal powers are those of a direct sedative. When taken in poisonous doses, the symptoms preceding death are very similar to those produced by asphyxia from any cause ; thus "it does not excite convulsive spasms, or bring on insensibility—but it exhausts the nervous energy of the spinal cord and voluntary muscles, occasioning merely convulsive tremors and slight twitches, and eventually general paralysis of the muscles, and consequent stoppage of the breathing" (Christison.) Much difference of opinion exists as to the action of hemlock when employed as a medicine, and consequently as to the diseases in which it proves beneficial ; this arises from the fact, that the preparations of hemlock which were in general use until very lately were perfectly inert ; for since the discovery of the active principle of the plant, it has been satisfactorily shown, that the application of even a moderate degree of heat, when continued for any time, causes it to be volatilized, and therefore that the extract (the preparation most generally employed,) when prepared according to the directions of the Dublin and London Pharmacopœias, is deprived almost completely of its medical powers. In the present day, but little faith is placed in the virtues of this plant or its preparations as a deobstruent and alterative in the treatment of glandular or visceral enlargements, of scrofulous affections, of secondary syphilis, or of chronic skin diseases, for which it was at one time highly esteemed. In my own practice I have seen very beneficial results follow the use of hemlock in many painful affections, some of which were attended with inflammation ; the preparation which I employed was the expressed juice carefully prepared from the fresh leaves gathered when the plant was in full flower. The diseases in which I have principally administered it are, rheumatic affections—both acute and chronic, neuralgia, senile gangrene, and cancer affecting various parts of the body ; in all of which I have found it alleviate pain and diminish nervous excitement. On the whole from the experience which I have had I am inclined to regard hemlock as an anodyne and sedative of much power, an opinion which from numerous communications that I have from time to time received is confirmed by the experience of others, who have employed it in consequence of my essay on its medicinal properties in the 26th and 28th volumes of the first series of the Dublin

Journal of Medical Science. Conia has been used on the continent as a substitute for the preparations of hemlock, and its effects are more certain and decided; but in consequence of its extreme activity as a poison, it is not likely to come into general use. Hemlock has been employed externally in the form of cataplasm or ointment to cancerous and painful ulcerations, and to tender glandular enlargements. In several cases in my own practice in which the use of the expressed juice of hemlock had been persevered in for some time, and the dose much increased, the patients complained of great dryness, with a painful feeling of constriction of the pharynx, which, however, soon disappeared on the suspension of its use and the administration of an active cathartic. In a few instances, also, headache with delirium occurred. These are the only physiological effects which I have seen produced by hemlock, although I have employed it very extensively for many years; and in no instance have I seen any injurious consequences result from its administration.

DOSE AND MODE OF ADMINISTRATION.—The dose of the powder of the leaves, a bad form, is from gr. v. to gr. x. three or four times a day; of the powder of the seeds gr. iij. to gr. vj. may be given; the quantity should be gradually increased.

Extractum Conii, D. L. E. ("Take of fresh hemlock leaves, collected when the plant begins to flower, any convenient quantity: the mode of preparation is the same as for *Extractum Belladonnæ*," D. "Fresh hemlock leaves, ℔j.; bruise them in a stone mortar; then press out the juice, and evaporate it unstrained to a proper consistence," L. "Take of conium, any convenient quantity; beat it into a uniform pulp in a marble mortar, express the juice and filter it. Let this juice be evaporated to the consistence of a firm extract, either in a vacuum with the aid of heat, or spontaneously in shallow vessels exposed to a strong current of air, freed of dust by gauze or screens.—This extract is of good quality only when a very strong odour of conia is disengaged by degrees on its being carefully triturated with Aqua Potassæ," E.) Dose, gr. iij. to gr. v. gradually increased. The extract is always an uncertain preparation, and does not keep well.

Tinctura Conii, L. E. (Hemlock leaves, dried, ℥v.; proof spirit, Oij.; macerate for seven days, express and strain," L. "Fresh conium leaves, ℥xij.; tincture of cardamom, Oss.; rectified spirit, Oiss.; bruise the leaves, express the juice strongly; bruise the residuum, pack it firmly in a percolator; transmit first the tincture of cardamom, and then the rectified spirit, allowing the spirituous liquors to mix with the expressed juice as they pass through; add gently water enough to the percolator for pushing through the spirit left in the residuum. Filter the liquor after agitation," E.). The tincture of the Edinburgh College is a much superior preparation to that of London as being prepared from the fresh leaves, nevertheless as the process requires some nicety of manipulation, it is apt to vary in strength, which the presence of the tincture of cardamoms will to a great extent prevent us from judging of; the dose of it is from min. xx. to min. xl. gradually increased.

Succus Conii, (Fresh hemlock leaves, any quantity; express the juice strongly; set aside for forty-eight hours, pour off the clear supernatant liquor, and add to it a fifth part of rectified spirit.) This is the most certain of the preparations of hemlock, as it is of a uniform strength, and keeps well for more than twelve months. Dose, min. xxx. gradually increased to fʒj. every third or fourth hour, its effects being carefully watched. It is best administered in camphor mixture or in distilled water sweetened with simple syrup, or syrup of red poppies.

Pilula Conii composita, L. (Extract of hemlock, ʒv.; ipecacuanha, powdered, ʒj.; treacle as much as may be sufficient; beat them together until they are incorporated.) Dose, gr. v. three times a day; intended for an anodyne and expectorant in hooping cough, bronchitis, and the incipient stage of phthisis, but from the observations made above on the extract, its powers must be very feeble.

Cataplasma Conii, L. (Boiling water, f℥x.; linseed meal, ℥ivss. or a sufficiency; extract of hemlock, ℥j; add the linseed by degrees to the water, constantly stirring so as to form a cataplasm; then spread the extract previously moistened with water over it.) A soothing poultice to painful ulcers or glandular enlargements. The fresh leaves, bruised, would form a much better application.

Unguentum Conii, L. (Fresh hemlock leaves; lard, of each, ℔j.; boil the hemlock in the lard until it becomes pliable; express through linen.) An anodyne and soothing ointment for neuralgic and muscular pains.

Emplastrum Conii, (Yellow wax, two parts; resin, and olive oil, of each, one part; soap plaster, a sixth part; melt together; and add to the mass when it begins to cool, powdered hemlock, two parts; mix thoroughly.) For neuralgic and rheumatic pains; in cancer of the stomach, liver, or uterus, over the site of these organs; and in glandular enlargements in the abdomen.

Conia has been but little employed in medicine as yet. The dose of the alkaloid, or any of its salts, is from a fiftieth to a thirtieth of a grain. Nega, who has published some observations on it, states that it is a most powerful sedative; he directs one grain to be dissolved in fʒij. of orange-flower water, and of this he gives four minims five times a-day.

INCOMPATIBLES.—The caustic alkalies; the vegetable acids; and vegetable astringents.

In cases of poisoning with hemlock, the same treatment should be followed as in poisoning with monkshood. (see page 334.)

CREASOTUM.—*Creasote* (described in the division *Astringents*,) when given in poisonous doses, appears from the observations of Dr. Rose Cormack, to resemble prussic acid in its sudden depressing action on the heart, as well as in the temporary nature of its toxicological operation. In medicinal doses, independently of its astringent property already described (see page 66,) it operates as a sedative and calmative; and has been chiefly used as such in nausea and vomiting, in checking which it proves highly beneficial, It is particularly serviceable in the morning sickness of pregnancy, and in cases of hysteric vomiting. Creasote will be also found very efficacious in allaying vomiting when it arises from nervous irritability, or functional disorder of the stomach; but it generally fails when organic disease is present, or where the vomiting is symptomatic of diseases of other organs. In the obstinate vomiting of sea-sickness, this remedy has been found by some to prove useful, and in all the nostrums of the present day for preventing sea-sickness creasote is a principal ingredient. To allay the inordinate thirst and excessive craving for food in diabetes, creasote is usually one of the most certain medicines which can be employed. In neuralgia and in phthisis, it has been highly praised by many as being almost a complete specific, but its efficacy in these diseases has not been well established.

DOSE AND MODE OF ADMINISTRATION.—Min. j. to min. ij., gradually increased to min. v. or min. vj. dissolved in at least an ounce or an ounce and a-half of some aromatic water; or made into an emulsion with distilled water by means of sugar or yolk of egg. In the administration of creasote, it should be borne in mind that its action is temporary, and consequently that the dose should be repeated at short intervals.

Mistura Creasoti, E. (Creasote; and acetic acid, of each, min. xvj.; compound spirit of juniper; and syrup, of each, f℥j.; water, f℥xiv.; mix the creasote with the acid, add gradually the water, and lastly, the syrup and spirit.) An excellent form for the administration of this medicine, the spirit of juniper concealing its disagreeable taste. Dose, f℥j. to f℥ij.: f℥j. contains min. j. of creasote.

DIGITALIS has been described in the division *Diuretics*, but as its active principle, *digitaline* acts only as a sedative, I have preferred noticing the mode of preparation and properties of that substance here.

PREPARATION.—*Digitaline:* "Take any quantity of dry digitalis, reduce it to coarse powder, and form it into a paste with spirit of the density ·860; separate the tincture by strong pressure, and repeat the operation a second time. Distil the alcoholic liquor and treat the residue with water acidulated with acetic acid; filter and add to the clear liquor a concentrated infusion of nut-galls as long as any precipitate is formed. Collect this precipitate carefully, and triturate it with an equal weight of finely powdered litharge, adding a few drops of spirit. Digest for a short time with rectified spirit (dens. ·840), at a temperature not exceeding 104° F. Filter, distil off the spirit, and agitate the residue with warm sulphuric ether, when the digitaline will be left as an insoluble residuum," HOMOLLE and HENRY. The quantity procured by this process is between a 70th and an 80th of the weight of the dried leaves used.

PROPERTIES.—*Digitaline* thus prepared is in the form of a white powder ; it has an excessively bitter taste, and is inodorous, but the smallest quantity of it produces violent sneezing. It is scarcely soluble in cold water or ether, requiring 2000 parts of the former and 1250 parts of the latter for its solution ; is soluble in 1000 parts of boiling water ; but is very soluble in either strong or weak spirit. It it perfectly neutral.

Digitalis administered in large doses acts as a narcotico-acrid poison, producing giddiness ; great debility ; stupor ; slow, feeble and intermittent pulse ; an abundant flow of saliva ; cold sweats ; and death, immediately preceded by coma and convulsions. In medicinal doses, when its use has been continued for some time, it operates as a direct sedative, its influence being chiefly manifested on the heart and arterial system ; this is indicated by the diminished force and frequency of the pulse, which also sometimes becomes irregular, and by the enfeebled action of the heart itself. If the use of digitalis be continued under these circumstances, although the dose be not increased, all the symptoms of poisoning come on, indeed in many cases will appear some days after its administration has been stopped ; hence it is evident that this medicine accumulates in the system, and therefore in cases where its use has been continued for any period, the administration of the remedy should be occasionally suspended, particularly as soon as its constitutional effects become obvious. From the sedative influence which digitalis exerts on the heart, it may be employed in all cases attended with over-excitement of the vascular system ; but where much inflammation is present, it is not sufficiently powerful as an antiphlogistic to be relied on, to the exclusion of more active treatment. It is in diseases of the heart and large arteries that this medicine is found most beneficial, and whenever the curative indication will be best fulfilled by diminishing the impulse of the heart, and by lowering the circulation generally, no remedy will produce these results so completely and so certainly as digitalis. It thus proves useful in simple hypertrophy of the heart, in some forms of nervous palpitation, in increased action of that organ arising from functional derangement not from organic disease, in aneurism of the aorta, and in active hemorrhages where the pulse is quick, hard, and throbbing ; its employment is contra-indicated in hypertrophy of the heart with or without dilatation, when that state is produced by obstruction, from any cause, to the circulation of the blood, or by regurgitation from insufficiency or other disease of the valves Digitalis has been also used in cases of insanity and of epilepsy ; in the latter affection, when not dependent on organic disease, it often proves singularly beneficial if given in very large doses, so as to bring the system rapidly under its influence ; in some cases which I saw with Dr Corrigan, recovery took place very rapidly under the following mode of employing this remedy :—f℥ij. of the infusion of digitalis were given every night at bed-time until its constitutional effect was produced, which was usually after the fourth or fifth dose ; its use was then suspended for two or three nights according to circumstances, and again the same quantity given as before; as soon as the system became affected, the number of fits was diminished, and under the continuance of this plan of treatment for a short time, their occurrence ceased altogether, or the return of the fits was postponed for a lengthened period. Some practitioners have administered digitalis as a sedative with excellent results in obstinate cases of tic douloureux. In the employment of digitalis as a medicine, its effects require to be carefully watched, and whenever it is continued for any length of time, the patient should not be allowed to use active exertion, and should be seen at least once daily by the medical attendant.

Digitaline is about a hundred times more active than digitalis, the sedative properties of which it appears to possess in a concentrated degree; a tenth of a grain having frequently reduced the pulse to 40 beats in the minute in from eight to ten hours after it had been taken. It has been used in France, and it is stated with much success in the treatment of intermittent fevers, and of spermatorrhœa. It has been proposed to apply it externally over a blistered surface in painful affections of the heart attended with excited action of the organ: but, when pure, even so small a quantity as the 65th part of a grain produces violent inflammation of the surface. The smallest over-dose of digitaline causes nausea and obstinate vomiting which last for many hours.

DOSE AND MODE OF ADMINISTRATION.—As a sedative, the dose of the preparations of digitalis is as follows:—of the powder, gr. j. to gr. iij.; of the infusion, fʒij. to f℥ij.; of the tincture, fʒss. to fʒiss. The dose of *digitaline* is from 1-12th to 1-10th of a grain repeated every sixth hour, its effects being most carefully watched.

Unguentum Digitalis.—HAMBURGH PHARMACOPŒIA. (Dried leaves of digitalis, in small fragments, ℥j.; rectified spirit, f℥ij.; digest with a gentle heat for four days in a well closed-vessel; mix intimately with ℔ss. of melted lard, and boil with a gentle heat until all the spirit is driven off; strain with expression and stir gently while cooling.) A useful sedative ointment in neuralgic and painful affections.

Succus Digitalis. (Prepared in the same manner as *Succus Conii*, see page 346). Dose, fʒj. to fʒij.

Extractum Digitalis, E. (Best prepared by any of the processes indicated for extract of conium, E.) An uncertain preparation. Dose, gr. ss. to gr. j.

Granules of Digitaline. (Digitaline, gr. xx.; powdered white sugar, ℥j.; mucilage, sufficient to make 1000 granules.) Each granule contains a fiftieth of a grain of digitaline. Dose, 4 to 5.

In cases of poisoning with foxglove, the stomach pump should be used, or powerful stimulating emetics immediately administered, and active stimulants both external and internal be assiduously employed.

LAURO-CERASUS, D. E.—*Cherry-laurel leaves. Leaves of Cerasus lauro-cerasus*, D. *Leaves of Prunus lauro-cerasus*, E. *Common Laurel.* A native of the shores of the Black Sea, whence it was introduced into Europe and the British Isles, where it now grows freely ; it belongs to the Natural family *Rosaceæ* (*Drupaceæ*, Lindley), and to the Linnæan class and order *Icosandria Monogynia.*

BOTANICAL CHARACTERS.—An evergreen small tree ; Stem smooth, much branched, 12–18 feet high ; Leaves, large, bright glaucous green, coriaceous ; Flowers, numerous, white, small, in axillary racemes ; Fruit, an ovoid, blackish drupe about the size of a small cherry.

PHYSICAL PROPERTIES.—Cherry-laurel leaves are employed in the recent state for use in medicine ; they emit an agreeable bitter-almond odour when bruised, and have a bitter rather astringent taste.

CHEMICAL PROPERTIES.—These leaves have not been accurately analysed ; their properties depend on a volatile oil, which they yield by distillation with water ; it resembles in odour and other properties the volatile oil of bitter almonds, and like it contains free prussic acid. The leaves differ much in the quantity of this oil which they yield at different periods of their growth, and consequently in their activity ; according to Christison, the greatest quantity is obtained from the buds and unexpanded young leaves in the months of May and June, at which time they yield 6·33 grains of oil in one thousand ; in July the proportion sinks to 3·1 grains, and in the following May to 0·6. Zeller states that they yield more oil when collected in cold wet weather than when gathered in a dry hot season. The water which comes over with the oil in the process of distillation acquires both its odour and taste, and is the only preparation of the plant which is employed in medicine.

ADULTERATIONS.—Cherry-laurel water varies much in activity, according to the time of the year in which it is prepared, and the care with which it is distilled. Its strength is most easily ascertained by the nitrate of silver test, as described for prussic acid (page 328). As it loses its activity by keeping, it should be distilled fresh every year.

THERAPEUTICAL EFFECTS.—Cherry-laurel leaves and the distilled water owe their virtues to the prussic acid which they contain, and consequently produce the same effects. An ounce of the distilled water has caused death in an adult. Cherry-laurel water is much employed in this country as a sedative in spasmodic cough, in phthisis, and in painful or spasmodic diseases of children ; for the latter purpose its agreeable flavour renders it peculiarly eligible ; it is, however, very liable to vary in strength, and should be therefore prescribed with caution.

DOSE AND MODE OF ADMINISTRATION.—Only in the following form :—

Aqua Lauro-cerasi, D. E. ("Fresh leaves of the common laurel, ℔j. ; water, Oiiss. ; upon the leaves, chopped, and crushed in a mortar, macerate the water for 24 hours, and then draw over a pint of liquid by distillation, using a Liebig's condenser and chloride of zinc bath. Filter the product through paper, and preserve it in a well-stopped bottle," D. "Fresh cherry-laurel leaves, ℔j. ; compound spirit of lavender, f℥j. ; water, Oiiss. ; chop down the leaves, mix them with the water, distil off a pint, agitate the distilled liquid well, filter it if any milkiness remains after a few seconds of rest, and then add the lavender spirit," E.) The compound spirit of lavender is added as a colouring ingredient to prevent mistakes from the preparation being taken for common water; the odour, however, is quite sufficient for this purpose, and consequently the spirit of lavender has been omitted in the formula of the last edition of the Dublin Pharmacopœia. The dose for adults is from fʒss. to f℥j. ; for infants or children, min. ij. to min. x.

INCOMPATIBLES.—Same as for hydrocyanic acid ; as is also the treatment in cases of poisoning.

POTASSII CYANIDUM.—*Cyanide of Potassium. Cyanuret of Potassium. Hydrocyanate of Potassa.*

PREPARATION.—*Parisian Codex*, 1837. "Reduce proto-cyanuret of potassium and iron to coarse powder, half fill a retort with it, place the retort in a good reverberatory furnace, adapt a tube to collect the gas ; heat moderately to expel the water of crystallization, then raise the temperature so as to fuse the mass, which will be announced by a disengagement of gas ; keep up the temperature so that the disengagement will be regular and moderate ; increase the heat progressively, and maintain it at a very high degree for a quarter of an hour, close the extremity of the tube, close also the apertures of the furnace, and leave the whole to cool ; then break the retort and carefully detach the upper stratum which forms a kind of well-fused enamel. This is the pure cyanide of potassium ; include in a well-ground stoppered bottle, remove afterwards the spongy black mass which is found in the lower part ; it is a mixture of cyanide of potassium, iron, and charcoal, include it also in bottles." Mr. Donovan of this city has added the following directions to the above process :—The retort should be of forged iron, a quicksilver bottle will answer perfectly, provided it be sound ; in its screw plug must be fitted an iron tube so bent that its other extremity may be plunged half an inch below the surface of a little water in a cup. By this means the different steps may be more easily regulated, as the issue of gas is more conveniently observed. The iron bottle should be only half filled with recrystallized ferrocyanide of potassium ; and as soon as the process is completed, when cold it may be cut in two by a chisel and heavy hammer. The black impure cyanide at the bottom of the retort is totally unfit for medicinal use.—It may be also obtained very readily and of great purity by passing a stream of hydrocyanic acid through an alcoholic solution of pure potash : a plan first proposed by Wiggers.

PHYSICAL PROPERTIES.—Cyanide of potassium, thus procured, is a whitish, semi-transparent, crystalline mass, having an enamelled appearance. It is inodorous when quite dry, but if moistened emits the odour of hydrocyanic acid. It has an acrid, alkaline, somewhat bitter taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassium and one of cyanogen. Exposed to the air it absorbs moisture and deliquesces, being converted into carbonate of potash by the absorption of carbonic acid from the atmosphere and the evolution of hydrocyanic acid. Cyanide of potassium has an alkaline reaction on vegetable colours; is fusible by heat without change, and unalterable even by a white heat provided air be excluded. It is very soluble in water, but is insoluble in strong alcohol. By solution in water it is converted into the hydrocyanate of potassa.

ADULTERATIONS.—As commonly met with in the shops, this preparation is seldom fit for use in medicine. When pure it should be perfectly white and afford a completely colourless solution with distilled water; if it be at all yellow, it contains iron, which diminishes its activity much. It should be also perfectly free from odour, as if it have any smell of prussic acid, it contains water, is of uncertain strength, and is perhaps undergoing slow decomposition.

THERAPEUTICAL EFFECTS.—Cyanide of potassium possesses precisely similar properties to hydrocyanic acid, as a substitute for which it is used in medicine. Its advantages over that acid are its unvarying strength, and its permanence of constitution, when properly prepared and carefully preserved; but its great liability to deliquesce has prevented its general introduction into the practice of medicine. To remedy this defect, Mr. Donovan has suggested "that consumers should keep the cyanide of potassium in small wide-mouthed well-stoppered bottles, not quite filled with the salt, but completely filled with alcohol of 0·800; which when of this strength exerts scarcely any solvent power on the cyanide, but will effectually preserve it from the deteriorating influence of the air. When a few grains are required for use, they may be drawn up by an iron wire, like potassium out of naphtha, and heated in a spoon for a moment to drive off the adhering alcohol."

DOSE AND MODE OF ADMINISTRATION.—The dose of the pure cyanide of potassium is from one-eighth to one-fourth of a grain. If it be desirable to administer the prussic acid contained in the salt in a free state, this may be done by prescribing it in combination with any weak acid, as with citric acid, recent lemon-juice, or syrup of lemons. One-sixth of a grain of pure cyanide of potassium is equal to about one minim of the medicinal prussic acid of the Dublin Pharmacopœia.

Syrup of Cyanide of Potassium, MAGENDIE. (Cyanide of potassium, gr. viij.; simple syrup, f℥xvj.; mix.) Dose, fʒij. to fʒvj. It is always better to prescribe this preparation in the form of draughts in consequence of its liability to become decomposed.

Calmative Lotion, TROUSSEAU. (Cyanide of potassium, gr. viij.; distilled water; alcohol; and sulphuric ether, of each, f℥j.; mix.) For external use only.

INCOMPATIBLES.—All acids, and acidulous salts.

SPIRITUS PYROXILICUS, D.—*Pyroxylic spirit. Medicinal Naphtha. Hydrated Oxide of Methyl.*

PREPARATION.—An article of the Materia Medica in the Dublin Pharmacopœia. According to Dr. Ure of London it is prepared by mixing crude pyroligneous acid with lime, and then distilling the pyrolignite of lime which yields abou tone per cent. of crude spirit. The spirit is purified by repeated distillation from quick lime (Christison.) But the mode of preparation of the liquid sold under the name of *medicinal naptha*, and used in medicine in the present day, is kept secret by the chemists who prepare it; there is no doubt, however, but that it is a product of the destructive distillation of wood.

PHYSICAL PROPERTIES.—A colourless, transparent, limpid fluid, with an agreeable, ethereal, alcoholic odour, bearing some resemblance to that of acetic ether, and an aromatic, not unpleasant taste. Specific gravity, ·846, D.

CHEMICAL PROPERTIES.—The chemical characters of medicinal naphtha are those of pyroxylic spirit, under which name it has been introduced into the last edition of the Dublin Pharmacopœia. It is miscible with water and alcohol in all proportions, an increased temperature being produced on its addition to the former. It is very volatile, and boils at about 150° F., is inflammable, burning with a pale blue flame, and is perfectly neutral to test paper.

ADULTERATIONS.—Ordinary naphtha is sometimes substituted for medicinal naphtha (pyroxylic spirit), but may be readily distinguished by the chemical characteristics given above.

THERAPEUTICAL EFFECTS.—This remedial agent was first introduced into the practice of medicine by Dr. Hastings, who along with the late Dr. Hocken vaunted it as a perfect cure for pulmonary consumption. They both agreed in describing its effects on the system generally as those of a stimulant, and considered its curative action to depend on its possessing a solvent power over tubercle. Although few, if any, believe now that phthisis can be cured by this agent, it must be confessed that the results of the experience of nearly all who have tried its effects in this disease, are strongly confirmatory of its being a most useful remedy, and in this opinion I fully agree. It appears to me, however, to act as a direct sedative: the harassing cough and troublesome vomiting so frequent attendants on the advanced stages of consumption, being more relieved by it than by any other remedy I have employed; and it is consequently in cases in which these symptoms are very prominent that it proves most beneficial.

DOSE AND MODE OF ADMINISTRATION.—Min v. to min. xx. three or four times a day. It may be given in some aromatic water and sweetened with syrup if necessary. The following is the mixture which I ordinarily employ:—

Mistura Naphthæ Medicinalis, (Medicinal naphtha, f℥ij.; compound tincture of cardamoms, fʒvj.; water, f℥vij.; mix.) Dose, f℥ss. every fourth hour.

TABACUM, D. L. E.—*Tobacco. Leaves of Nicotiana tabacum.* A native of America, belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—A viscid, herbaceous annual; Stem, 3–6 feet high, erect, branching at the top; Leaves, sessile, ovato-acuminate, very large, pale green; Flowers, in panicles, rose-coloured; Capsules, two-celled, loculucidal, containing many small somewhat reniform, brown seeds.

PREPARATION.—In the month of August the plants are cut above their roots, and dried under sheds; when perfectly dry, the leaves are stripped off, twisted, tied in bundles, and packed with great compression into hogsheads for exportation. Virginia tobacco in leaf should be the kind employed for medical purposes.

PHYSICAL PROPERTIES.—Virginia tobacco leaves are of a dark brown colour with yellowish spots, and have an unctuous feel. Their odour is peculiarly heavy and narcotic; their taste bitter and nauseous.

CHEMICAL PROPERTIES.—Tobacco is composed of a peculiar, liquid, colourless, volatile, alkaloid which has been named *nicotina;* of a concrete volatile oil, *nicotianin;* of bitter extractive, gum, chlorophyll, vegetable albumen, gluten, starch, malic acid, and some salts. Its properties depend on the alkaloid and on the volatile oil. The former is heavier than water, is odourless when cold, but when heated has the odour of tobacco, and an acrid burning taste, so intense as to communicate it perceptibly to 10,000 parts of water; its composition is $C^{20} H^{14} N^{2}$, and its specific gravity 1·048. The latter has also the odour of tobacco, its taste is bitter and aromatic, leaving an unpleasant sensation in the throat, it does not exist in recent tobacco leaves, and therefore must be developed during the process of drying. By burning tobacco an *empyreumatic oil* is produced from the decomposition of some of its constituents; this is usually found in pipes which have been used for some time in smoking; it is a very active poison. Tobacco leaves yield their properties readily to boiling water, alcohol, and spirituous liquors.

The adulterations of tobacco are unimportant in relation to its medical employment.

THERAPEUTICAL EFFECTS.—Tobacco taken internally in large doses acts as a powerful narcotico-acrid poison; the most marked symptoms are nausea, fainting, great exhaustion, general relaxation both of the voluntary and involuntary muscles, extreme depression of the circulatory powers (marked by the feeble fluttering pulse, cold extremities, paleness of the face, &c.), convulsions, paralysis, and death. In very small doses it is said to act as a diuretic, and sometimes as a laxative. In full medicinal doses, it operates as a direct sedative of the vascular system, and also of the cerebral functions. It is principally used in medicine to relax the muscular fibres:—thus it is employed in the form of enema, in strangulated hernia, in stricture or obstruction of the bowels from other causes, in retention of urine from spasmodic stricture of the urethra or from spasm of the neck of the bladder, in obstinate constipation, in severe colic, and in tetanus; in all of which diseases its beneficial effects depend on its relaxing influence over the muscular system. Tobacco was formerly employed as a diuretic in dropsy, and also as an anthelmintic, but in the present day it is rarely used for either purpose. As an external agent the infusion or decoction may be applied by means of compresses in any of the cases above enumerated in which its sedative action is indicated; and in America an ointment is used in chronic cutaneous diseases, especially those of the scalp, but its use requires very great caution, as it has in some instances produced fatal results; for the same reason although a certain application for the destruction of vermin, the infusion of tobacco is but seldom employed for that purpose.

DOSE AND MODE OF ADMINISTRATION.—The use of tobacco requires great caution, as, in order to produce a sedative influence, its poisonous effects must be partially induced. For the preparation of an enema of tobacco, formulæ are given in the three British Pharmacopœias, but in no instance should a larger quantity be used at first than from gr. xv. to gr. xx. infused in Oj. of boiling water, for cases are on record where so small a quantity as ʒj. and even ʒss. have proved fatal.

Enema Tabaci, D. L. E. ("Tobacco leaf, ℈j.; boiling water, f℥viij.; infuse for one hour in a covered vessel, and strain," D. "Tobacco, ℈j.; boiling water, Oss.; macerate for an hour and strain," L. "Tobacco, gr. xv. to ʒss.; boiling water, f℥viij.; infuse for half an hour and strain," E.)

Vinum Tabaci, E. ("Tobacco, ℥j.; sherry, f℥xij.; digest for seven days; strain, express strongly the residuum, and filter the liquors.) Sedative and diuretic, but rarely used. Dose, min. x. to min. xl.

In cases of poisoning with tobacco, if the poison had been swallowed, emetics should be immediately administered; and in all cases the most powerful stimulants, both external and internal, should be employed. The vegetable astringents have been proposed as antidotes for tobacco, tannin forming an insoluble precipitate with *nicotina*.

ZINCI CYANIDUM,—*Cyanide of Zinc. Cyanuret of Zinc. Hydro-cyanate of protoxide of Zinc.*

PREPARATION.—Pass the vapour of prussic acid into distilled water in which is suspended recently prepared hydrated oxide of zinc, which is obtained by adding in excess, water of caustic potash to a solution of chloride of zinc.

PROPERTIES.—It is a solid white salt, inodorous and insipid; is composed of one equivalent of cyanogen, and one of zinc; and is insoluble in both water and alcohol.

THERAPEUTICAL EFFECTS.—This salt has been proposed on the continent as a substitute for hydrocyanic acid or the cyanide of potassium. The dose is from gr. ¼ to gr. j., but its insolubility renders it an objectionable preparation. In Germany it has been employed as an *anthelmintic* for children.

CHAPTER XVII.

SIALOGOGUES.

(Masticatories.)

SIALOGOGUES are substances, which by *local* stimulant action augment the secretion of saliva. By this definition are excluded the so-called *remote* or *specific* sialogogues, as the preparations of mercury, gold, &c., which generally produce an increased flow of saliva when their internal use has been continued for some time; but as their remediate powers do not depend merely on the increase of this secretion, it is, I think, more practical to confine the term *sialogogue* to those agents which are employed as direct stimulants to the salivary glands. There are but few substances used in the present day in the practice of medicine for this purpose, and their application to the treatment of disease is very limited.

ARMORACIA, L. E.—*Horse-radish. The fresh root of Cochlearia armoracia.* Indigenous; belonging to the Natural family *Cruciferæ (Brassicaceæ,* Lindley), and to the Linnæan class and order *Tetradynamia Siliculosa.*

BOTANICAL CHARACTERS.—Roots, perenial, fleshy, white, running deep into the ground; Stems, about two feet high; Leaves large, much veined; Flowers, white.

PHYSICAL PROPERTIES.—When bruised or cut, the fresh root emits a very acrid penetrating odour; it has a strong pungent taste. The acrimony of the roots is lost by drying, but they may be preserved fresh for a long time by keeping them packed in sand in a damp cellar.

CHEMICAL PROPERTIES.—The active principle of horse-radish is a very acrid volatile oil, which may be obtained by distillation. The root yields its acrimony to both boiling water and alcohol; but it is dissipated by boiling.

THERAPEUTICAL EFFECTS.—Horse-radish root is an excellent sialogogue, producing a copious secretion of saliva. It has been sometimes employed in paralysis of the tongue, but like the other remedies of this class, it has nearly fallen into disuse. (See, also, *General Stimulants).*

MEZEREON (described in the division *Diaphoretics)*, has been occasionally used as a masticatory in tooth-ache and in difficulty of deglutition from paralysis. A small piece of the bark should be frequently chewed and the saliva assiduously rejected.

PYRETHRUM, L. E.—*Pellitory of Spain. Root of Anacyclus pyrethrum.* A native of Asia Minor, and of the central parts of Europe; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnean class and order *Syngenesia Superflua.*

BOTANICAL CHARACTERS.—Root fusiform; Stems, several, procumbent, somewhat branched, pubescent; Branches, one-headed; Florets of the ray, white above, purplish beneath; of the disc, yellow.

PHYSICAL PROPERTIES.—It is in short tapering pieces, from 3 to 4 inches in length and about the thickness of the little finger. The bark is thick and of a dark-brown colour with black shining spots; the internal structure is dirty yellow with a radiated appearance. It is inodorous, but when chewed produces a peculiar pricking sensation on the tongue and lips.

CHEMICAL PROPERTIES.—According to Parisel's analysis, the acrimony of this root depends on an acrid resin *Pyrethrin*, of which it contains 3 per cent.; the other constituents are, inulin, gum, tannin, colouring matter, lignin, a trace of iron and silica, and some salts. It yields its virtues to alcohol and ether, but not to water.

THERAPEUTICAL EFFECTS.—Pellitory root is the most useful of this class of remedies, acting as a powerful local stimulant to the salivary glands, and causing a copious secretion of saliva. It is used for this purpose in tooth-ache, neuralgia of the face, rheumatism of the jaws, and paralysis of the tongue; in the latter of which affections I have employed it with benefit. It has been also employed in relaxation of the uvula. From ʒss. to ʒj. of the root may be chewed frequently. A tincture prepared by macerating for seven days one part of the powdered root in five parts of rectified spirit and one of water, is used by some dentists to relieve tooth-ache.

CHAPTER XVIII.

GENERAL STIMULANTS.

(Excitants ; Incitants ; Hypersthenics.)

It is difficult to define what is understood in the practice of medicine by the term Stimulant, excitement of the vital energies is produced by such different means under different circumstances ; with no class of remedies, therefore, is it more necessary to bear in mind the truth of the axiom, that medicines act merely *relatively*. In general terms Stimulants may be defined to be, agents which produce a sudden but not permanent augmentation in the activity of the vital functions. This effect is evidently due to their operation on the circulatory and cerebro-spinal systems—both of which are excited to increased energy ; and many of them act topically on the parts of the body to which they may be applied, giving rise to local hyperemia. Most therapeutists, however, agree in thinking that their primary effect is produced on the nervous system, the circulation being affected only secondarily ; but with this view of their mode of action I cannot agree, nor is it at all consonant with the many therapeutical indications, to fulfil which this class of medicines is being constantly employed in the practice of medicine. In their mode of action when administered internally, General Stimulants resemble in some respects Tonics ; thus, immediately after their administration, a feeling of tone or increased power is produced, which, however, is not permanent, being almost invariably followed by a corresponding depression of vital power ; their effects also are more immediate and more manifestly perceived by the senses than those of Tonics. Many of the remedies contained in this division are closely related to Narcotics, for example, alcohol and the ethers ; the secondary effect of both of which, particularly if given in large doses, is to produce sleep and coma : this does not, however, appear to be, as with Narcotics, from any direct action on the nervous system, but either to result from exhaustion of the previously over-excited vital energy, or to be produced by the inhalation of their vapour by the lungs as it passes off from the stomach,—a state resembling the anæsthesia caused by the vapour of chloroform or the ethers thence resulting. The great number of medicines contained in this class, and the material difference of their action in relation to the particular effects which they produce on the animal economy, prevent any general rules from being laid down as to their administration in disease. The peculiarities in their mode of operation will be more conveniently considered when treating of the therapeutical effects of each.

ACIDUM ACETICUM CAMPHORATUM, D. E.—*Camphorated acetic acid.* An officinal substitute for aromatic vinegar.

PREPARATION.—" Take of camphor, ℥j. ; rectified spirit, fʒj. ; strong acetic acid, f℥x. Reduce the camphor to powder, by trituration with the spirit ; then add the acid, and dissolve," D. " Camphor, ℥ss. ; acetic acid, f℥viss. ; pulverise the camphor with a little rectified spirit, and dissolve in the acetic acid," E.

This preparation is only employed as an external stimulant, the vapour being applied to the nostrils in syncope, or to rouse the vital energies when depressed by any cause. It is exceedingly pungent and very volatile, and should be therefore kept in well-stopped bottles.

Aromatic Vinegar of the shops is a solution of camphor, and the volatile oils of cloves, lavender, and rosemary in the strongest acetic acid ; its odour is more agreeable than that of the officinal preparation.

ÆTHER ACETICUS.—*Acetic ether.* Not employed in this country, but officinal in most of the continental pharmacopœias.

PREPARATION.—*Parisian Codex.* " Rectified spirit, 100 parts ; concentrated acetic acid, 63 parts ; strong sulphuric acid, 17 parts ; mix, and distil over a sand-bath 125 parts ; deprive this of any free acetic acid it may contain by means of carbonate of potash, set aside until it settles, pour off the clear liquor and distil 100 parts."

PHYSICAL PROPERTIES.—It is a colourless, transparent, very volatile liquid, with an agreeable, refreshing odour, and a warm ethereal taste, leaving a cooling impression on the palate. Specific gravity, ·860.

CHEMICAL PROPERTIES.—According to the recent chemical theories as to the constitution of the ethers, acetic ether is an *acetate of oxide of ethyl*, its composition is $C^8 H^8 O^4$, or $C^4 H^5 O + C^4 H^3 O^3$; it boils at 165°. It is soluble in 7 parts of water, and in alcohol and ether in all proportions. Acetic ether when free from water, may be kept unchanged in stoppered bottles, but if it contains water, is rapidly converted into acetic acid and alcohol ; the alkalies decompose it with great facility.

THERAPEUTICAL EFFECTS.—Acetic ether is an agreeable but mild general stimulant, at one time much used on the continent in hysteria and nervous affections; at present it is chiefly employed externally as an ingredient in stimulating liniments.

Camphorated Acetic Liniment, PELLETIER. (Soap; and camphor, of each, ʒij.; acetic ether, f℥ij.; dissolve in a water-bath, and add oil of origanum, min. xx.) An excellent stimulating liniment in rheumatic and arthritic pains, and in sciatica.

ÆTHER, L. ÆTHER SULPHURICUS, D. E.—*Ether. Sulphuric ether. Oxide of ethyl. Ether prepared from alcohol by means of sulphuric acid*, L.

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. *Dublin.*—"Take of rectified spirit, Oiij.; oil of vitriol of commerce, f℥viij.; fresh burned lime in fine powder, ℥j. Mix the acid and ten ounces of the spirit in a glass matrass, capable of holding a quart at least, and, without allowing the mixture to cool, connect the matrass with a Liebig's condenser, and applying a sufficient heat to maintain the liquid in brisk ebullition, commence the distillation. As it proceeds, admit gradually, through a glass tube traversing the cork of the matrass, the remainder of the spirit, regulating its influx so that the boiling liquid shall maintain a constant level; and when the entire of it has been introduced, continue the application of the heat until the contents of the matrass become black, and show a tendency to froth over. (The tube through which the spirit enters should dip by its lower extremity, where its diameter is contracted, at least half an inch, beneath the surface of the liquid in the matrass; and the eduction pipe of the reservoir for the spirit, with which the exterior extremity of the glass tube is connected, should be furnished with a stop-cock, to regulate the descent of the spirit. This reservoir also should be placed at least three feet above the level of the boiling liquid.) The crude ether thus obtained is to be agitated with the pulverized quick-lime, and then rectified, the distillation being continued as long as the product, on being well shaken, continues to have a specific gravity lower than 750. The resulting liquid should be preserved in a cool place in accurately stopped bottles. A fresh reservoir being attached to the further end of the condenser, and the distillation resumed, a product will be obtained which may be substituted for rectified spirit in a subsequent ether process." *Edinburgh.*—"Take of sulphuric acid, f℥x.; rectified spirit, f℥l.; pour f℥xij. of the spirit gently over the acid in an open vessel, and then stir them briskly and thoroughly; transfer the mixture immediately into a glass matrass connected with a refrigeratory, and raise the heat quickly to about 280°. As soon as the ethereal fluid begins to pass over, supply fresh spirit through a tube into the matrass in a continuous stream, and in such quantity as to equal the volume of the fluid which distils over. This is best done by connecting one end of the tube with a graduated vessel containing the spirit, passing the other end through a cork fitted into the matrass, and having a stop-cock on the tube to regulate the discharge. When the whole spirit has been added, and f℥xlij. have distilled over, the process may be stopped; agitate the impure ether with f℥xvj. of saturated solution of muriate of lime, containing also ℥ss. of lime recently slaked. When all odour of sulphurous acid has disappeared, pour off the supernatant liquid and distil it with a gentle heat so long as what passes over has a density not higher than 735. More ether of equal strength may be obtained from the muriate of lime; and from the residuum of each distillation a weaker ether may be obtained in small quantity, which must be rectified by distilling it gently again."

PHYSICAL PROPERTIES.—Ether is a transparent, colourless, very mobile liquid, with a fragrant penetrating odour, and a pungent aromatic taste, leaving a sense of coldness on the tongue and palate. The specific gravity of the Dublin and London preparation is ·750.

CHEMICAL PROPERTIES.—Its composition is $C^4 H^5 O$ or E O, being an oxide of *ethyl.* It is extremely volatile; it boils between 96° and 98°; is highly combustible, burning with a white flame and the formation of carbonic acid and water. Great cold is produced by its evaporation. When recently prepared, ether is perfectly neutral, but soon becomes acid by keeping. One part of ether dissolves in 10 parts of water, while 36 parts of ether dissolve 1 of water; it combines in all proportions with alcohol. Sulphuric ether dissolves most resins, the volatile oils, and many of the vegetable alkaloids.

ADULTERATIONS.—Ether frequently contains water and alcohol; from bad keeping, acetic acid is also often present. The latter may be detected by the effect on litmus paper, and water by the density being higher than that indicated by the colleges. The presence of alcohol, as well as the quantity if it be present, is satisfactorily ascertained by the test of the *Edinburgh Pharmacopœia:*—"When agitated in a minim measure with half its volume of concentrated solution of muriate of lime, its volume is not lessened." If the solution of ether in water be not perfectly transparent, the presence of ethereal oil may be suspected. The following are the characteristics and tests given for it in the London Pharmacopœia:—"Colourless; specific gravity, not exceeding ·750; it evaporates in the air; it does not redden litmus paper or but very slightly; half a pint of water is required to combine completely with a fluid ounce of it."

THERAPEUTICAL EFFECTS.—The action of sulphuric ether when taken internally is that of a general diffusible stimulant; but its effects, which are rapidly produced, are equally transient. In very large doses it is a narcotic poison, producing death with symptoms similar to those caused by alcohol. Applied externally, the action is refrigerant, owing to the cold produced by its immediate evaporation. As a stimulant, ether is chiefly employed in spasmodic and nervous affections unaccompanied by inflammation: thus, it is used with benefit in cramp in the stomach, in spasmodic or flatulent colic, in nervous palpitations, in hiccup, in nervous head-ache, during a paroxysm of spasmodic asthma, in aphonia, &c. It is also administered frequently with good effect in the advanced stages of fever when subsultus tendinum and hiccup are present; and as an immediate stimulant in fainting and asphyxia. In the employment of ether as a stimulant, the transient nature of its operation should be borne in mind, and consequently that the dose requires to be repeated at short intervals. The influence of ether over the system is much diminished by habit, it should be therefore administered to those who are accustomed to its use in much larger doses than to others. The effects of the vapour of ether when inhaled have already been adverted to (page 339), but its employment is now very generally supplanted by chloroform; in some parts of America, however, as already remarked, it still holds its ground, and many of the United States physicians and surgeons employ a mixture of two or three parts of ether and one of chloroform to produce anæsthesia. Externally, ether has been applied with friction as a local stimulant in rheumatic and neuralgic pains. In pharmacy it is employed to extract the active principle of many medicines.

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒij.; it is usually administered in some aromatic water. "Ether may be readily incorporated with water or any aqueous vehicle by rubbing it up with spermaceti, employed in the proportion of gr. ij. for each fluid drachm of the ether," *(United States Dispensatory).* The vapour of ether differing from chloroform in being of very light specific gravity, requires for its inhalation that the patient should be in the erect position, and in consequence of its volatility that an apparatus or ether inhaler, of which many forms have been proposed, should be employed for its administration.

Spiritus Ætheris Sulphurici, E. (Sulphuric ether, Oj.; rectified spirit, Oij.; mix them together. Density, 809; it does not affect litmus paper, or render water muddy; when agitated with twice its volume of concentrated solution of muriate of lime, 28 per cent. of ether separate by rest.) Uses and properties similar to those of ether. Dose, fʒj. to fʒiij. It is miscible with water in all proportions.

Oleum Æthereum, L. (Rectified spirit, Oij.; sulphuric acid, f℥xxxvj.; solution of potash; and distilled water, of each, f℥j. or as much as may be sufficient; mix the acid cautiously with the spirit. Let the liquor distil until a black froth arises, then immediately remove the retort from the fire; separate the lighter supernatant liquor from the heavier one, and expose the former to the air for a day; add to it the solution of potash first mixed with water and shake them together. Lastly, when sufficiently washed, separate the ethereal oil which subsides.) This preparation is only employed as an ingredient in the following compound:—

Spiritus Ætheris compositus, L. (Sulphuric ether, f℥viij.; rectified spirit, f℥xvj.; ethereal oil, fʒiij.; mix.) The same observations apply to this and the following preparation.

Spiritus Æthereus Oleosus, D. (Take of rectified spirit, Oiss.; oil of vitriol of commerce, Oiss.; sulphuric ether, f℥v. Mix the oil of vitriol with one pint of the rectified spirit, in a matrass of glass, and connecting this with a Liebig's condenser, apply heat, and distil, till a black froth begins to rise. Separate the uppermost or lighter stratum of the distilled liquid, and, having exposed it in a capsule for twenty-four hours to the atmosphere, let the residual oil be transferred to a moist paper filter, and washed with a little cold water, so as to remove any adhering acid. Let it now be introduced into a bottle containing the remainder of the spirit mixed with the ether, and dissolved.) Commonly known as *Hoffman's anodyne liquor;* it is used in nearly the same cases as sulphuric ether, but its properties are more decidedly antispasmodic; the dose is fʒss. to fʒij. It is miscible with water in all proportions. This preparation is often prescribed in combination with laudanum, the disagreeable subsequent effects of which it usually prevents.

In cases of poisoning with ether, the stomach pump should be immediately used; cold affusion and the most powerful internal and external stimulants assiduously employed; and in extreme cases artificial respiration had recourse to.

ALCOHOL, D. E. *Absolute alcohol of the density* 795, D., 794-6, E.

PREPARATION.—*Dublin.*—" Take of stronger spirit, one pint; pulverized fresh burned lime, ten ounces: having introduced the lime and spirit into a matrass, connected in the usual manner with Liebig's condenser, let heat be applied until the lime begins to slake, and, when this process is completed, distil by means of a chloride of zinc bath until the liquid which comes over, together with that obtained during the slaking, measures two ounces. This being rejected, the receiver should be changed, and the distillation resumed, and continued until a product of nearly sixteen ounces is procured. The specific gravity of this product is 795." *Edinburgh.*—" Rectified spirit, Oj.; lime, ℥xviij.; break down the lime into small fragments, expose the spirit and lime together to a gentle heat in a glass matrass till the lime begins to slake; withdraw the heat till the slaking be finished, preserving the upper part of the matrass cool with damp cloths; then attach a proper refrigeratory, and with a gradually-increasing heat distil off f℥xvij. The density of this alcohol should not exceed 796; if higher, the distillation must have been begun before the slaking of the lime was altogether finished." SPIRITUS FORTIOR, D.—The following formula for *Stronger spirit* directed by the Dublin College to be used in the preparation of alcohol is given in their last pharmacopœia:—" Take of rectified spirit, half a gallon; carbonate of potash from pearl-ash, eight ounces; having dried the carbonate of potash at a low red heat, and rapidly reduced it to powder in a warm mortar, let it be shaken occasionally for four hours in a bottle with the spirit, maintaining the temperature of the mixture at or about 100°. After a subsidence of twenty minutes' duration, the liquid will form two distinct strata, the uppermost of which (measuring about seventy-four ounces) should be separated by decantation or a syphon, and then distilled with the aid of a Liebig's condenser and chloride of zinc bath, until the product amounts to seventy-two ounces. The specific gravity of this spirit is 818.

PHYSICAL PROPERTIES.—Alcohol, which has been omitted from the last edition of the London Pharmacopœia, is a transparent, colourless liquid, with a pungent, rather agreeable odour, and an acrid burning taste. Its density varies with the quantity of water it contains; that of the spirit of the pharmacopœias has been given above. RECTIFIED SPIRIT (*Spiritus rectificatus*, D. L. E., Spirit of Wine), is an article of the Materia Medica; the Dublin College fixes its specific gravity at ·840; the London at ·838 at 62° F.; and the Edinburgh at ·838, at 60° F.—PROOF SPIRIT (*Spiritus tenuior*, D. L. E.) is directed by the Dublin College to be prepared as follows:—" Take of rectified spirit seven pints; distilled water, four pints: mix. The specific gravity of proof spirit is 920." In the London and Edinburgh Pharmacopœias it is an article of the Materia Medica, but as met with in commerce, it is unfit for medical use as containing essential oil; in the Edinburgh Pharmacopœia it is therefore directed to be prepared "by mixing together Ovj. of rectified spirit, with Oiij. of distilled water, at a temperature of 60°," and in the London it is stated that it may be procured " by adding Oiij. of distilled water to Ov. of rectified spirit at a temperature of 62° F." The specific gravity of proof spirit, according to the laws of the kingdom, is ·920 at 60° F.; and it is of this strength by the directions of the Dublin and London Colleges; the Edinburgh fixes it at ·912, at 60° F.

CHEMICAL PROPERTIES.—Absolute alcohol is a *hydrated oxide of ethyl;* its composition is $C^4H^5O + HO$, or $EO + HO$. It boils at 173°; is very volatile, and highly inflammable, burning with a pale blue flame free from smoke, water and carbonic acid being the products of its combustion; it has never been frozen. It attracts water from the air and therefore becomes weak if kept in an imperfectly closed vessel; is miscible with water in all proportions, a disengagement of heat, a diminution of bulk, and an increase of density accompanying their union. Alcohol dissolves the caustic alkalies and alkaline sulphurets; it also dissolves all the deliquescent inorganic salts, except carbonate of potash, but none of the salts which are insoluble or sparingly soluble in water, nor efflorescent salts. It likewise dissolves many vegetable substances, as all essential and most fixed oils, the vegetable alkaloids, sugar, resins, extractive, &c., for many of which purposes it is employed in pharmacy. Alcohol prevents the putrefaction of animal substances which are immersed in it, and hence its employment in the preservation of anatomical preparations. *Rectified* and *Proof spirit* have similar properties to alcohol, their taste is milder, their boiling point higher according to the state of dilution, their inflammability less, and the colour of the flame with which they burn deeper yellow the more water they contain. *Proof spirit* is defined by law to be such that at the temperature of 51° F., 13 volumes of it weigh exactly as much as 12 volumes of water; 100 parts of spirit of this strength consist of 49 parts by weight of absolute alcohol, and 51 parts by weight of distilled water, at 60°.

ADULTERATIONS.—The specific gravity is a sufficient test of the strength of alcohol and the weaker spirits, but in ascertaining their density, the temperature should be at the same time carefully noted, for the lower the temperature, the greater will be the density of the spirit. The rectified spirit of British commerce frequently contains *oil of grain,* a contamination derived from the corn during the process of distillation. Its presence is readily detected by the test of the *Edinburgh Pharmacopœia,* "f℥iv. treated with 25 minims of solution of nitrate of silver (gr. j. to gr. xl. of water), exposed to bright light for 24 hours, and then passed through a filter purified by weak nitric acid, so as to separate the black powder which forms, undergo no farther change when again exposed to light with more of the test." The same test is applicable to both alcohol and proof spirit. The following are the characteristics and tests given for rectified spirit in the London Pharmacopœia:—"Colourless, not muddied on the addition of water, nor coloured red by sulphuric acid."

THERAPEUTICAL EFFECTS.—Alcohol is the intoxicating principle of all spirituous liquors. In moderate doses properly diluted it acts as a general stimulant, exciting particularly the vascular and nervous systems; in somewhat larger quantity it produces the well-known effects of intoxication ; and in excessive doses it acts as a powerful narcotic poison, rapidly causing death, preceded by slow pulse, contracted pupils, and coma : this effect is most usually observed when a large quantity of ardent spirits has been drank at once. As a stimulant, alcohol is employed in medicine to support the vital powers in the advanced stages of fevers, particularly those of a low or typhus character; for this purpose brandy—*Spiritus Vini Gallici*, an article of the Materia Medica in the London Pharmacopœia—or whiskey is usually employed, but wine is generally preferred, (see *Vinum*). It is often used in flatulent colic, in indigestion, in vomiting, and in fainting. As an external stimulant, spirit is a common ingredient in lotions, for sprains and bruises, for many forms of external inflammations—as erysipelas and erythema, for various chronic skin diseases, to prevent excoriations in parts exposed to prolonged pressure, and with friction over the region of the heart in syncope and suspended animation. Diluted with six parts *by measure* of water, it has been used as an injection, after tapping, for the radical cure of hydrocele. In consequence of its producing cold by evaporation, alcohol is frequently added to cooling and evaporating lotions.

DOSE AND MODE OF ADMINISTRATION.—In fevers, brandy or whiskey is given diluted with water or in the form of punch ; the quantity which ought to be given depends so much on the circumstances of each particular case, that it would be impossible to lay down here any general rule on the subject. In the fever which proved so fatal to the British Legion in Spain in the year 1835, Dr. Lardner frequently gave so much as 32 ounces of brandy in the 24 hours.

Mistura Spiritus Vini Gallici, L. (Brandy ; cinnamon water, of each, f℥iv. ; the yolks of two eggs; sugar, ℥ss.; oil of cinnamon, min. ij. ; mix.) An agreeable and excellent stimulant in doses of f℥ss. to f℥iss.

Spiritus Chloroformi. (Chloroform, 1 part ; rectified spirit, 7 parts ; mix.) This combination has been lately much employed under the names of *Chloric ether* and *Terchloride of Carbon* as a stimulant in convulsive and spasmodic affections, in chronic bronchitis, and in fever. The dose of it is from min. xx. to f℥j. in a draught with syrup or some mucilaginous fluid.

Methylated spirit. (A mixture of pyroxylic spirit and spirit of wine.) This compound would scarcely require a notice here, were it not that it has been recently used fraudulently by some chemists for the preparation of medicinal tinctures, extracts and spirituous liniments. It was introduced into commerce by the Board of Inland Revenue in the year 1854 with the intention of permitting spirit of wine to be used free of duty in certain trades and manufactures ; the mixture of one part by measure of pyroxylic spirit with nine parts of spirit of wine forming so disagreeable a compound that by no artificial process could the spirit be again rendered fit for potable purposes. Methylated spirit is of a muddy yellowish colour, and has a most disagreeable odour and taste; its specific gravity is 0·815 and it boils at 169° F. The great cheapness of this compound compared with spirit of wine first suggested its use in pharmacy for the purposes above mentioned, but the matter having been during this year referred to the Colleges of Physicians by the Board of Revenue, an unanimous report against its employment in pharmaceutical preparations was very wisely, in my opinion, come to by the three colleges.

In poisoning with ardent spirits, the contents of the stomach should be immediately evacuated by means of the stomach-pump, and external stimulants, especially the cold affusion, assiduously employed. The coma of ordinary intoxication is best treated by the internal use of ammonia, or the solution of the acetate of ammonia; if apoplectic symptoms be present, cold lotions to the head, the application of leeches to the temples, and warmth to the extremities, will be found most useful.

AMMONIACUM, D. L. E.—*Gum-ammoniac. Gum resinous exudation of Dorema ammoniacum. Gum-resin hardened in the air, emanating from the stem and flower-stalk of Dorema ammoniacum*, L. The plant indicated above, which is the true source of this drug as met with in commerce, although M. Buhse believes it to be the Dorema aucheri, is a native of Persia; but the ammoniacum of the ancients was procured from the *Ferula orientalis*, a native of Morocco, in which country it is obtained from it even in this day. They both belong to the Natural family *Umbelliferæ* (*Apiaceæ*, Lindley,) and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—A glaucous-green plant, 7-9 feet high; Stem about 4 inches in diameter, branching; Leaves, large, 2 feet long, on downy petioles, sheathing at the base; Flowers, immersed in wool, white, in proliferous, racemose umbels.

PREPARATION.—The gummy juice which pervades the whole plant oozes forth on the slightest puncture. During the warm season, the branches and stem are attacked by innumerable beetles, by which it is pierced in all directions; through these punctures the juice exudes, and soon concretes into a hard gum, when it is picked off by the country people. The ammoniacum which is imported in masses is directed in the London Pharmacopœia to be prepared for use in medicine as follows:—*Ammoniacum præparatum;* Lump ammoniacum, ℔j.; water sufficient to cover it; boil together until they are mixed; strain the mixture through a hair sieve, and evaporate in a water-bath, constantly stirring that it may be hard when cold."

PHYSICAL PROPERTIES.—Ammoniac is met with in various-sized roundish tears, or in masses composed of the tears agglutinated together. They are of a yellowish or reddish-brown colour externally, internally they are white and shining like enamel, hard and brittle, and vary in size from that of a small pea to that of a walnut. The odour is peculiar, faintly nauseous, more powerful when heated; the taste is bitter and disagreeable.

CHEMICAL PROPERTIES.—Ammoniac is a gum-resin containing about 80 per cent. of resin and 18 per cent. of gum, with a trace of volatile oil. It is softened by exposure to heat, is inflammable and burns with a white flame. It does not dissolve in water, but is miscible with it, forming a milky emulsion, the gum which is soluble suspending the resin in the mixture. It is soluble in both ether and alcohol.

THERAPEUTICAL EFFECTS.—Ammoniac is a general stimulant of but little power; its effects were at one time generally believed to be chiefly manifested on the respiratory organs, and consequently it was classed amongst expectorants, and employed in chronic bronchitis; but any benefit that may have resulted from its use as such, depended on its general stimulant properties; and by many practitioners it is still highly prized as a stimulant expectorant. It possesses some antispasmodic powers, but is much inferior as such to the other fetid gum-resins. In the present day it is chiefly employed, as an external stimulant in the form of plaster, to scrofulous tumours, chronic enlargement of the joints, indolent glandular swellings, &c., in which it often proves useful.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. in pills or made into an emulsion with milk or water.

Mistura Ammoniaci, D. L. ("Take of gum of ammoniac, ʒij.; water, f℥viij.; triturate the gum with the water gradually added, until the mixture assumes the appearance of milk; then strain through muslin," D. "Ammoniacum prepared, ʒv.; water, Oj.; rub the ammoniacum with the water gradually poured in, until they are perfectly mixed," L.) This mixture has a milky appearance, the resin being suspended in the water by means of the gum. It was formerly commonly employed, and is still used, as a basis for expectorant mixtures in chronic chest affections. Dose, f℥ss. to f℥j.

Emplastrum Ammoniaci, D. L. E. ("Take of gum ammoniac, in coarse powder, ℥iv.; proof spirit, f℥iv.; dissolve the gum ammoniac in the spirit, with the aid of heat, and strain; then evaporate the solution by means of a steam or water-bath, stirring constantly until it acquires a proper consistence," D. "Ammoniacum prepared, ℥v.; dilute acetic acid, f℥viij.; dissolve the ammoniacum in the acid; then evaporate the liquor to a proper consistence over a slow fire, constantly stirring," L. "Ammoniacum, ℥v.; distilled vinegar, f℥ix.; dissolve the ammoniacum in the vinegar, and evaporate over the vapour-bath, with constant agitation, until a due consistence be obtained," E.)

Emplastrum Gummosum, E. (Litharge plaster, ℥iv.; ammoniac; galbanum; and bees' wax, of each, ℥ss.; melt the gum-resins together, and strain them, melt also together the plaster and wax, add the former to the latter mixture, and mix the whole thoroughly.) This or the foregoing plaster should be spread on leather or strong linen for application; when left on for some time, they often produce an eruption of small pimples.

AMMONIÆ LIQUOR, D. L. AMMONIÆ AQUA, E.—*Diluted aqueous solution of ammonia* (described in the division *Antacids*,) is a general stimulant, prompt, but temporary in its action. It is principally used in typhus fever when there is great deficiency of nervous power; in the advanced stages of continued fever when all inflammatory action has subsided; in the cold stage of intermittents; in the eruptive fevers should the eruption have receded from the skin, and in the latter stages of pneumonia if there be much depression of the vital powers. Owing to its stimulant operation, ammonia is also found useful in spasmodic affections which depend on the increased irritability that accompanies depression of the nervous system, as in hiccup, in subsultus tendinum, in the nervousness caused by excessive smoking or the use of intoxicating liquors, and in some forms of hysteria and of asthma. It is the best internal stimulant that can be employed in the coma of intoxication, and in poisoning with *sedatives.* As an external stimulant, the vapour of ammonia is inhaled in syncope, and in asphyxia. Solution of ammonia may be administered as a stimulant in the same doses as directed in the division *Antacids;* but it should be given repeatedly, and at shorter intervals.

AMMONIÆ SESQUICARBONAS, D. L. AMMONIÆ CARBONAS, E.—*Sesquicarbonate of ammonia* (described in the division *Antacids*,) is employed as a stimulant in the same cases as the aqueous solution of ammonia, to which it is usually preferred. The chief advantage that ammonia and the sesquicarbonate possess as stimulants in febrile diseases is, that they rouse the energies of the system without producing that disturbance of the brain which is liable to result from the use of vinous liquors. Dose, gr. v. to gr. xv. dissolved in camphor mixture, or any simple vehicle, every four or five hours. It should not be administered in the solid state, from its liability to produce vomiting when thus given.

AMMONIÆ HYDROSULPHURETUM, D.—*Hydrosulphuret of ammonia. Hydrosulphate of ammonia.*

PREPARATION.—Take of solution of ammonia, f℥iv.; sulphuret of iron, ℥iss.; oil of vitriol of commerce, fʒiss.; water, f℥xv.; distilled water, fʒij.; place the sulphuret of iron and water in a two-necked bottle, and, adding the oil of vitriol by degrees through a safety funnel, conduct by suitable tubes the sulphuretted hydrogen which is disengaged, first through the distilled water placed in a small intermediate phial, and then to the bottom of a bottle containing the ammonia, the neck of the latter, through which the gas tube conveying the gas passes, being loosely plugged with tow. If, when the development of gas has ceased, a drop of the ammoniacal liquid added to a saturated solution of sulphate of magnesia gives no precipitate, the preparation is completed; but should a precipitate occur, the hydro-sulphuret still contains free ammonia, and must therefore be again subjected to the action of a stream of sulphuretted hydrogen. The hydro-sulphuret of ammonia must be kept in a green glass bottle, furnished with an accurately ground stopper. The specific gravity of this solution is ·999.

PROPERTIES.—A greenish-yellow, very fetid liquid, emitting an odour of sulphuretted-hydrogen gas, and having an acrid, very disagreeable taste. It is a solution of the neutral hydrosulphate of ammonia in water. Exposed to the air it deposits sulphur, owing to the escape of some of the ammonia; and on the addition of any of the mineral acids, sulphuretted-hydrogen gas is evolved.

THERAPEUTICAL EFFECTS.—This preparation has nearly fallen into disuse. It was formerly employed with the idea of de-oxygenising the system in diabetes, as also of diminishing the morbid appetite attendant on that disease. It possesses also some slight stimulant properties; nevertheless, although it has been retained in the last edition of the Dublin Pharmacopœia, it might be well spared from the list of medical agents. The dose is from min. iv. to min. vj. in one or two fluid ounces of some distilled or aromatic water.

AMMONIÆ MURIAS, D. E. AMMONIÆ HYDROCHLORAS, L.—*Muriate of ammonia. Hydrochlorate of ammonia. Chloride of ammonium. Sal-ammoniac.*

PREPARATION.—An article of the Materia Medica. It is procured by manufacturers on the large scale, by decomposing the sulphate of ammonia which is formed in the manufacture of coal gas, or from the carbonate of ammonia obtained by the distillation of bones. In either case, the decomposing agent employed is common salt, (chloride of sodium.)

PHYSICAL PROPERTIES.—This salt generally occurs in large crystalline cakes, convex on one side, concave on the other, of a greyish-white colour, semi-transparent. It is tenacious, and difficult to reduce to powder; inodorous, with a pungent, acrid, bitter, and nauseous taste. Specific gravity, 1.45.

CHEMICAL PROPERTIES.—Muriate of ammonia is composed of one equivalent of chlorine, two of hydrogen, and one of amidogene, its formula being $Cl, 2H, NH^2$ (Kane.) It is permanent in the air; and if exposed to heat sublimes unchanged; is soluble in 2·72 parts of water at 60°, and in its own weight of boiling water; and is also soluble in alcohol. During its solution in water, a great degree of cold is produced. This salt is best characterised by the evolution of gaseous ammonia, which takes place when it is rubbed in a mortar with quicklime.

THERAPEUTICAL EFFECTS.—Hydrochlorate of ammonia is not much employed in this country as an internal remedy; but on the continent, especially in France and Germany, it bears a high character as a stimulant in mucous fevers as soon as the acute inflammatory symptoms have subsided, in the slighter cases of inflammations of the serous membranes, in the milder forms of pneumonia and of hooping cough, in mucous diarrhœa, in chronic rheumatism and gout, and in passive dropsies. I have found it useful in some cases of adynamic fever, and in the subacute forms of laryngitis. M. Cless has employed it extensively in the early stages of tubercular phthisis, and he states with the most decidedly beneficial results. As a topical remedy muriate of ammonia is very generally used as an ingredient in discutient lotions, and, in consequence of the cold produced during its solution in water, as an external refrigerant.

DOSE AND MODE OF ADMINISTRATION.—Internally, gr. v. to gr. xxx. combined with some aromatic powder, in the form of pill or of bolus, or dissolved in some aromatic water. For external use it may be dissolved in water, or in vinegar in the proportion of from ʒij. to ℥ss. of the salt in a pint of liquid, to which rectified spirit is generally added. A refrigeratory mixture may be prepared, by dissolving five parts each of this salt and of nitre in sixteen parts of water, which will reduce the temperature forty degrees.

INCOMPATIBLES.—Sulphuric and nitric acids; potash, soda, lime, magnesia, and their carbonates; and most metallic salts.

If an overdose of this salt has been taken, vomiting should be promoted by the use of tepid mucilaginous and demulcent drinks.

AMMONIÆ SPIRITUS, E.—*Spirit of Ammonia. Solution of ammonia in rectified spirit.*

PREPARATION.—Rectified spirit, Oij.; fresh burnt lime, ℥xij.; muriate of ammonia in very fine powder, ℥viij.; water, f℥viss.; let the lime be slaked with the water in an iron or earthen vessel, and cover the vessel till the powder be cold; mix the lime and muriate of ammonia quickly and thoroughly in a mortar, and transfer the mixture at once into a glass retort; adapt to the retort a tube which passes nearly to the bottom of a bottle containing the rectified spirit; heat the retort in a sand-bath gradually, so long as anything passes over, preserving the bottle cool. The bottle should be large enough to contain one-half more than the spirit used.

PROPERTIES.—This preparation, which has been omitted from the last editions of the Dublin and London Pharmacopœias, is a transparent, colourless liquid, with a pungent ammoniacal odour, and an acrid taste. It is very volatile, and acts as an alkali on vegetable colours. Specific gravity about ·845.

THERAPEUTICAL EFFECTS.—Spirit of ammonia is a stimulant of some power, and may be used as such in the same cases as the aqueous solution of the gas. Dose, fʒss. to fʒiss. in some aromatic water, or in camphor mixture. It is generally employed, however, in the following form only:—

Spiritus Ammoniæ aromaticus, D. L. E. ("Take of rectified spirit, Oiij.; stronger solution of ammonia, f℥vj.; oil of lemons, f℥ss.; oil of nutmeg, fʒij.; oil of cinnamon, fʒss.: dissolve the oils in the spirit, and add the solution of ammonia; mix with agitation and filter. The specific gravity of this solution is 852," D. "Hydrochlorate of ammonia, ℥vj.; carbonate of potash, ℥x.; cinnamon, bruised; and cloves bruised, of each ʒiiss.; lemon peel, ℥v.; rectified spirit; and water, of each, Oiv.; mix, and distil, Ovj.: specific gravity, ·918," L. "Spirit of ammonia, f℥viij.; volatile oil of lemons, fʒj.; volatile oil of rosemary, f℥iss.; dissolve the oils in the spirit by agitation," E.) An excellent and agreeable stimulant in fainting, hysteria, nervous debility, and flatulent colic. Dose, min. xxx. to fʒj. in distilled water, or in camphor mixture.

Tinctura Ammoniæ composita, L. (Mastich, ʒij.; rectified spirit, f℥ix.; oil of lavender, min. xiv.; stronger solution of ammonia, Oj.; macerate the mastich in the spirit that it may be dissolved, and pour off the clear tincture; then add the other ingredients, and shake them all together.) A powerful stimulant, chiefly used in hysteria. Dose, min. v. to min. x. in water.

ANETHUM, L. E.—*Dill. Fruit of Anethum graveolens.* A native of the South of Europe; belonging to the Natural family *Umbelliferæ (Apiaceæ*, Lindley,) and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—An annual, 1–2 feet high; Stem, striated; Leaves, decompound, with fine capillary segments; Flowers, yellow.

PROPERTIES.—The fruit, commonly called *dill-seed*, is elliptical, flat, of a brownish colour, with a lighter coloured, thin, membranous margin. The odour resembles caraway; the taste is pungent, somewhat bitter. It contains about three per cent. of a light yellow volatile oil, on which its properties depend.

THERAPEUTICAL EFFECTS.—An aromatic stimulant, sometimes used in the flatulent colic of children, and in the form of dill water as a vehicle for other remedies, chiefly purgatives, the griping properties of which it corrects.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒj. of the bruised fruit for adults.

Oleum Anethi, L. E. An article of the Materia Medica in the London Pharmacopœia. "Prepared according to the general directions for the preparation of volatile oils," E. Dose, min. j. to min. v. rubbed up with sugar.

Aqua Anethi, L. E. ("Dill, bruised, ℔iss.; water, cong. ij.; distil a gallon. *Or*, Oil of dill, fʒij.; powdered flint, ʒij.; distilled water, cong. j.; rub the oil first with the flint, then diligently with the water, and filter the liquor," L. "Anethum seeds, bruised, ℥xviij.; rectified spirit, f℥iij.; water, cong. ij.; mix them together and distil off one gallon," E.) Dose, f℥ss. to f℥iij.

ANGELICA, E.—*Root of Angelica archangelica.* Indigenous, but very rare; belonging to the Natural family *Umbelliferæ (Apiaceæ*, Lindley,) and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Biennial, 4–5 feet high; Stem 1–2 inches thick, fistulose; Leaves, bipinnate; Flowers, greenish-white.

PROPERTIES.—The root is imported from Hamburgh ; it consists of numerous branches of the thickness of the little finger, proceeding from a short spindle-shaped root-stalk, grayish-brown externally, whitish within. The odour is aromatic and agreeable ; the taste warm, aromatic and pungent. The fruit, commonly called *angelica seed,* is oval, obtuse, 1–2 lines long, of a yellowish-brown colour, flat and longitudinally striated on one side, convex on the other; it has the odour and taste of the root. The medicinal properties of both root and fruit depend on a volatile oil, which may be obtained by distillation ; a peculiar crystalline acid has been also found to exist in it, which has been named *angelicic* acid. The root contains besides, bitter extractive and a bitter resin.

ADULTERATIONS.—On the continent an adulteration of angelica root with the root of the *Ligusticum levisticum* (Lovage,) has been indicated ; it may be readily detected by its yellow-coloured pith when cut traversely, that of angelica root being white.

THERAPEUTICAL EFFECTS.—An aromatic stimulant and carminative not much used. Dose of the *powdered root,* gr. x. to ʒss. ; of the *bruised fruit,* ʒss. to ʒj.

ANISUM, D. L. E.—*Anise. Fruit (Seeds,* D.) *of Pimpinella anisum.* A native of Egypt and the Levant, extensively cultivated in various parts of Europe ; it belongs to the Natural family *Umbelliferæ (Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Annual, about a foot high ; Stem, smooth, erect, branching ; Leaves of the stem, decompound ; Flowers, small, white, in terminal umbels.

PROPERTIES.—The fruit (incorrectly named seed in the Dublin Pharmacopœia), commonly called *aniseed,* is ovoid, composed of two mericarps, with five primary ridges, slightly hairy, of a yellowish-brown colour ; it has a peculiar, sweet, aromatic odour, and a warm, sweetish taste. Its properties depend on a volatile oil, of which it contains 3 per cent. ; this oil is transparent and nearly colourless, having a slight greenish-yellow tinge ; it congeals at 50° F., and does not become fluid again under 62°. Its specific gravity is ·980 ; and it has the odour and taste of the fruit.

ADULTERATIONS.—The oil of star-anise *(Illicium anisatum),* which resembles oil of anise in odour and appearance, is often sold for it ; the fraud is one of little consequence, but may be readily detected, as star-anise oil retains its fluidity at 35° F. The fruit of the hemlock has been confounded with *aniseed,* in consequence of which fatal accidents have in more than one instance occurred ; they may be distinguished by the odour, and by the elevated ridges of anise fruit being smooth at the margin, not crenulate.

THERAPEUTICAL EFFECTS.—Anise is an aromatic stimulant and carminative ; and as such is employed in flatulent colic, and in the diarrhœa of infants and children. It is said to promote the secretion of milk in nurses. It is much used on the Continent to flavour liqueurs.

DOSE AND MODE OF ADMINISTRATION.—Of the bruised fruit gr. x. to ʒss.

Oleum Anisi, D. L. E. ("Prepared according to the general directions for distilling volatile oils," D. E. An article of the Materia Medica, L.) This oil is generally imported from Germany and the East Indies. Dose, min. ij. to min. viij. rubbed up with sugar.

Essentia Anisi, D. (Take of oil of anise, one fluid ounce; rectified spirit, nine fluid ounces. Mix with agitation.) Dose, min. xx. to min. xl.

Spiritus Anisi, L. (Anise oil, fʒiij.; proof spirit, cong. j.; dissolve.) Dose, from fʒss. to fʒj.

Aqua Anisi, D. (Take of essence of anise, f℥j.; distilled water, cong. ss. Mix with agitation, and filter through paper.) Dose, f℥ss. to f℥ij.

ARMORACIA.—*Horse-radish* (described in the division *Sialogogues)*, is sometimes used as a warm stimulant, chiefly as an adjunct to other medicines; it was formerly classed amongst the Antiscorbutics, but is little employed in the present day. Sliced horse-radish is a useful addition to the warm foot-bath to render it more stimulant. The following are the officinal preparations:—

Infusum Armoraciæ compositum, L. (Horse-radish root, sliced; mustard, bruised, of each, ℥j.; compound spirit of horse-radish, f℥j.; boiling distilled water, Oj.; macerate the root and the seeds in water for two hours in a vessel lightly covered, and strain, then add the spirit.) Dose, f℥j. to f℥ij.

Spiritus Armoraciæ compositus, L. (Horse-radish root, sliced; and dried orange peel, of each, ℥xx.; nutmegs, bruised, ʒv.; proof spirit, cong. j.; water, Oij.; mix, and with a gentle fire distil a gallon.) Dose, fʒj. to fʒiv.

ARNICA MONTANA.—*Leopard's bane. Flowers, leaves, and root of Arnica montana.* A native of the Alps and of the Pyrenees; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua.*

BOTANICAL CHARACTERS.—Perennial, about a foot high; Stem, hairy, simple and single-flowered, or compound and many-flowered; Leaves, oval, entire; Flowers, golden-yellow.

PROPERTIES.—The whole plant has a strong, peculiar odour, and a herbaceous, acrid, somewhat bitter taste. The flowers and leaves are collected in July, and the roots in September. The flowers are principally used at present; they consist of resin, on which probably their active properties chiefly depend, a bitter active principle (*cytisin*,) yellow colouring matter, gum, and some salts. Weber has also obtained from them a small quantity of blue volatile oil; and Mr. Bastick states that he procured from them a peculiar alkaloid which he named *Arnicina*, but his investigations require confirmation. They yield their active principles to water and to alcohol.

THERAPEUTICAL EFFECTS.—Arnica, which has been omitted from the last edition of the Dublin Pharmacopœia, bears a high character on the continent, particularly in Germany, as a stimulant in adynamic febrile affections, in chronic rheumatism, in paralysis, in amaurosis, &c., but it is very rarely used in this country. I have found a tincture of the flowers prove of service in nervous head-ache. Arnica is one of the most prominent articles in the Homœopathic Materia Medica, possessing, according to the professors of that system of quackery, the most wonderful therapeutic powers, and being employed by them in the treatment of the most opposite diseases.

DOSE AND MODE OF ADMINISTRATION.—Of the powder of the root, gr. x. three or four times a-day. The flowers are usually given in the form of infusion or tincture.

Infusum Arnicæ, (Arnica flowers, ℥ss.; boiling water, f℥xij.; infuse till cold, and strain.) Dose, fʒij. to f℥ss.

Tinctura Arnicæ, CODEX HAMBURGENSIS. (Arnica flowers, ℥iss.; rectified spirit, f℥xvj.; digest for 6 days, express and filter so as to obtain ten ounces.) This tincture may be readily prepared by percolation, having previously macerated the flowers with a little of the spirit for 24 hours; or it may be prepared with the cut and bruised root, in the proportion of ℥ij. of the root to Oj. of rectified spirit. Dose, fʒss. to fʒij.

INCOMPATIBLES.—The mineral acids; sulphate of iron; acetate of lead; and sulphate of zinc.

BALSAMUM PERUIFERUM.—*Balsam of Peru* (described in the division *Expectorants*), is an excellent stimulant in alopecia or baldness from a deficient action in the hair bulbs, and is also useful for promoting the growth of the hair after diseases of the scalp have been cured. It may be applied in the form of pomade as follows:—Prepared lard, ℥ij.; white wax, ʒij.; melt together; remove from the fire, and when they are perfectly cold, add with constant agitation, balsam of peru, fʒij.; and oil of rosemary, min. xx.

CAJEPUTUM, D. CAJUPUTI L. E.—*Oil of Cajeput. Volatile oil of the leaves of Melaleuca cajeputi*, D., *of Melaleuca minor*, L. E. The tree from which this oil is obtained is a native of the Molucca

Islands; and belongs to the Natural family *Myrtaceæ*, and to the Linnæan class and order *Polyadelphia Icosandria.*

BOTANICAL CHARACTERS.—Trunk, about 20 feet high, crooked, with scattered branches; Leaves, smooth, deep green, 3–5 inches long; Flowers, white, in short terminal spikes.

PREPARATION.—The volatile oil is procured from the leaves by distillation; the leaves are gathered in the end of September, macerated for 24 hours with water, and then put into a copper still with sufficient water to prevent empyreuma. The oil comes over with the water into the receiver and floats on the surface.

PROPERTIES.—Cajeput oil is limpid, very mobile, transparent, and of a fine pale bluish-green colour. It has a strong, agreeable odour, resembling a mixture of camphor, roses, and peppermint; the taste is warm and aromatic, leaving a sensation of coldness in the mouth. Its specific gravity is about ·919. It boils at 343°, and may be obtained nearly colourless by redistillation. The composition of this oil is $C^{10} H^{9} O$. It is soluble in alcohol.

ADULTERATION.—In consequence of its high price and the great demand for the oil, when the cholera first raged in the British Isles, in 1832 and 1833, cajeput oil was often counterfeited with oil of rosemary coloured and flavoured with camphor and cardamom seeds. The fraud was one difficult of detection, but latterly it has been met with in a very pure state. As imported, it sometimes contains copper, which may be recognised by its affording a reddish precipitate when agitated with a solution of ferrocyanide of potassium.

THERAPEUTICAL EFFECTS.—Cajeput oil is a powerful diffusible stimulant, at present not much used. When Asiatic cholera appeared in Europe in 1832, it was highly extolled as a remedy for that disease, but it did not retain its reputation long. It is much employed on the Continent in chronic rheumatism, gout, hysteria, and other nervous affections. Dose, min. v. to min. x. rubbed up with sugar. It also forms a useful external rubefacient, for which purpose ʒss. may be dissolved in fʒij. of rectified spirit.

CALAMUS AROMATICUS, E.—*Sweet Flag. Rhizome of Acorus calamus.* Indigenous; belonging to the Natural family *Acoraceæ* (*Orontiaceæ*, Lindley), and to the Linnæan class and order *Hexandria Monogynia.*

BOTANICAL CHARACTERS.—Rhizome, creeping, with many long roots; Leaves, 2–3 feet high, bright green; Flowers, pale green, arranged upon a spadix.

PROPERTIES.—The rhizome or root-stalk, in the dried state as met with in the shops, is in flattened pieces from 3 to 5 inches long, and half an inch broad, with a corrugated, yellowish-brown, scaly cuticle; internally spongy, with a pinkish-yellow hue. It has a very agreeable odour, and a pungent bitter taste. Sweet flag-root is composed of soft resin, extractive, gum, inulin, a trace of volatile oil, some salts and woody fibre. It yields its properties to alcohol, and to water.

THERAPEUTICAL EFFECTS—An aromatic stimulant, scarcely ever employed, and consequently omitted from the last edition of the London Pharmacopœia. It may be used as an adjunct to tonics in debility of the digestive organs. Dose, in powder, gr. xx. to ʒj. ; in infusion,—prepared by digesting ℥j. of the bruised rhizome in f℥xij. of boiling water for an hour,—f℥j. to f℥ij.

INCOMPATIBLES.—Acetate of lead.

CALX CHLORINATA, D. L. E.—*Chlorinated lime. Bleaching salt of lime. Hypochlorite of lime with chloride of calcium. Chloride of lime. Bleaching Powder.*

PREPARATION.—It is an article of the Materia Medica in the three British Pharmacopœias, being usually prepared on the large scale for commercial purposes, by exposing hydrate of lime from the purest lime, to chlorine gas, the latter being supplied so gradually as to prevent the heat occasioned by the combination from rising above 62°.

PHYSICAL PROPERTIES.—As commonly met with, this is a white or yellowish-white somewhat moist powder, with a faint odour of chlorine, and an acrid, disagreeable, persistent taste.

CHEMICAL PROPERTIES.—Hypochlorite of lime when pure is a mixture of 1 equivalent of tribasic hypochlorite of lime, 1 of chloride of calcium and 2 of water, $1\ \mathrm{Ca\,O,\ ClO,} + \mathrm{Ca\,Cl,} + 2\ \mathrm{Aq}$. Exposed to the air it deliquesces, evolves hypochlorous acid, and attracting carbonic acid, is converted into carbonate of lime, and chloride of calcium It is partially soluble in water, a little hydrate of lime being left undissolved ; the solution has a strong alkaline reaction, and bleaches vegetable colours, especially if an acid be added, so as to evolve the chlorine. Its best characteristics are its peculiar odour in solution, its bleaching properties, and the white precipitates it affords with solutions of nitrate of silver, of carbonates, and of oxalates.

ADULTERATIONS.—This compound frequently contains a very small quantity of chlorine, either from having been originally badly prepared or from careless preservation ; various processes have been described for *chlorimetry;* but for medical purposes the tests for the purity of the powder as given in the *Edinburgh Pharmacopœia* are amply sufficient :—" Pale grayish-white ; dry ; gr. l. are nearly all soluble in f℥ij. of water, forming a solution of the density 1027 ; and of which 100 measures, treated with an excess of oxalic acid, give off much chlorine, and if then boiled and allowed to rest 24 hours, yield a precipitate which occupies 19 measures of the liquid."

THERAPEUTICAL EFFECTS.—Hypochlorite of lime acts as a powerful stimulant, whether taken internally, or applied locally ; it also possesses in a remarkable degree the property of destroying fetid effluvia, particularly when arising from the decay of animal matter, and of arresting or preventing the putrefactive process. In medicine it has been chiefly administered as an internal remedy in the advanced stages of typhus fever, and in epidemic dysentery, being found particularly useful when the evacuations are very offensive. As a topical agent it is employed with benefit in the form of lotion to foul or gangrenous ulcers with excessive discharge, extensive burns or scalds, in purulent opthalmia, in chronic cutaneous diseases, particularly scabies, which it seldom fails to cure speedily and effectually, and as an injection in diseases of the rectum, the uterus, or vagina when accompanied by fetid discharges. In excessive mercurial salivation a gargle of one part of hypochlorite of lime dissolved in 100 parts of water will be found both very effectual in correcting the fetor, and checking the excessive secretion. This substance has been employed as a disinfectant, to prevent the spreading of epidemic diseases, and to destroy infection or contagion, but much doubt exists as to its disinfecting properties. It is also used for the purpose of destroying noxious effluvia arising from the decay of animal or vegetable matter, but for this purpose it is inferior to *Solution of chlorinated soda.* In poisoning with sulphuretted hydrogen or hydrosulphuret of ammonia, chlorinated lime or soda is the best antidote; the solution should be given internally and the vapour applied to the nostrils.

DOSE AND MODE OF ADMINISTRATION.—Internally, gr. ij. to gr. v. dissolved in water and sweetened with sugar, or in some aromatic distilled water. For external use solutions of various strengths are employed : in purulent ophthalmia, ʒss. to ʒij. in f℥j. of water; for cutaneous diseases, ℥iij. to Oj. of water ; for a lotion or injection, gr. xx. to gr. xxx. in f℥j. of water. Solutions of this substance should be always filtered to remove the insoluble hydrate of lime, and kept in well-stoppered bottles to prevent the escape of the chlorine. When it is desired to disengage the chlorine rapidly from hypochlorite of lime, any weak acid may be added to the solution. The following is the officinal solution of the Dublin Pharmacopœia:—

Calcis Chlorinatæ liquor, D. (Take of chlorinated lime, ℔ss. ; water, cong. j. Blend well the water and chlorinated lime by trituration in a large mortar, and, having transferred the mixture to a stoppered bottle, let it be well shaken several times for the space of three hours. Pour out now the contents of the bottle on a calico filter, and let the solution which passes through be preserved in a well-stopped bottle. The specific gravity of this liquid is 1035.) A fluid ounce contains nearly 44 grains of chlorinated lime.

INCOMPATIBLES.—Sulphuric acid, and its salts ; the alkalies ; and all soluble carbonates, and oxalates.

In poisoning with chlorinated lime albuminous liquids, such as white of egg, milk, flour and water, &c., and emetics, should be given : acids must be carefully avoided.

CAMPHORA, D. L. E.—*Camphor. Camphor of Camphora officinarum,* D. E. *A concrete prepared by sublimation, from the wood of Camphora officinarum, and purified,* L. The Camphor tree is a native of China and Japan, and belongs to the Natural family *Lauraceæ,* and to the Linnæan class and order *Enneandria Monogynia.* The camphor obtained from the Dryobalanops camphora, a native of Borneo and Sumatra, belonging to the Natural family *Dipteraceæ,* which was officinal in the former edition of the Dublin Pharmacopœia, is never met with in European commerce, being altogether used by the Chinese, who pay a high price for it, employing it as a tonic and aphrodisiac, and also in affections of the eyes.

BOTANICAL CHARACTERS.—A handsome tree with a straight trunk, branching at the top; Leaves, oval, pointed, shining, evergreen, emitting a strong odour of camphor when bruised; Flowers, small, whitish, in axillary and terminal panicles; Fruit, a small, rounded, fleshy drupe, with an acrid, aromatic taste.

PREPARATION.—Camphor is procured from the small branches, the leaves, the wood, and the root of the tree, which are cut into pieces, and boiled with water in an iron cucurbit, to which an earthen capital is luted; the camphor sublimes, and is condensed on straws placed in the capital. In this coarse state it is imported into Europe, when it is purified by being sublimed in glass vessels, quick lime having been previously mixed with the crude camphor to retain the impurities. Borneo camphor is found in cavities and fissures in the heart of the tree, in the crystalline state, deposited from an oily fluid.

PHYSICAL PROPERTIES.—Refined camphor is met with in hemispherical masses, perforated in the centre; it is white, translucent, shining, fragile, with a crystalline fracture, nevertheless tough and pulverized with great difficulty, unless with the aid of a little rectified spirit. It is lighter than water, its density being 0·9857. It has a peculiar aromatic smell, and a bitter cooling taste.

CHEMICAL PROPERTIES.—Camphor is a species of solid volatile oil; its composition is C^{10} H^{8} O. It evaporates at the ordinary temperature of the air, forming minute crystalline masses on the sides of bottles in which it is kept; in close vessels it fuses at 347° and boils at 399°, condensing unchanged. It requires 1000 parts of water for its solution, to which, however, it imparts both odour and taste; but it may be suspended in water in large quantity by means of mucilage, sugar, yolk of egg, &c. It is very soluble in alcohol, ether, and the fixed and volatile oils. The solution in alcohol is precipitated by water. Milk dissolves an eighth of its weight of camphor, which it retains on the addition of water.

ADULTERATIONS.—Camphor is met with of great purity in this country, but is frequently adulterated on the continent with muriate of ammonia. The sophistication may be readily detected by rubbing a suspected specimen in a mortar with a little quicklime, which liberates the ammonia; or by treating it with water, which dissolves out the muriate of ammonia,

THERAPEUTICAL EFFECTS.—Much difference of opinion exists as to the action of camphor on the animal economy, but the most constant and most marked effect which it produces is that of a general diffusible stimulant; and this is borne out by the symptoms which are caused when it is taken in an over dose, viz:—great dyspnœa, violent palpitation of the heart, and continued vomiting. In the practice of medicine it has been used in a great variety of diseases, in consequence of the discrepancy which even still exists as to its effects; but the following are the principal maladies in which it proves decidedly beneficial. In the advanced stages of typhus fever, when nervous symptoms, as subsultus tendinum, delirium, &c., chiefly predominate. In spasmodic cholera, in which it should be given in large doses. In chronic bronchitis occurring in broken-down habits, particularly when accompanied by profuse secretion; in spasmodic and nervous diseases, provided there is no inflammatory tendency in the system; in atonic gout, and chronic rheumatism; and in irritable and painful diseases of the urinary organs. As an external application camphor is very generally employed, dissolved in spirit or in oil, as an embrocation for muscular and rheumatic pains, for bruises, to glandular enlargements, and to chilblains. It is also used with much benefit as a stimulant to foul and indolent ulcers, and to gangrenous sores occurring in the old and debilitated. Made into an ointment with prepared lard, it has been recently employed on the continent, and it is stated with success, in the treatment of chronic cutaneous diseases, particularly in those forms attended with much itching, which troublesome symptom it is stated speedily to allay. Camphor has been occasionally used in the form of vapour to promote diaphoresis when the skin is dry and harsh, and in old cutaneous affections.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. x. repeated at short intervals; it is usually given in the form of pill, or made into an emulsion with water by means of mucilage, sugar, yolk of egg, &c.; ʒij. of camphor may be permanently suspended in f℥viij. of water by means of f℥j. of thick mucilage, or it may be dissolved in new milk as observed above.

Mistura Camphoræ, D. L. E. ("Take of tincture of camphor, f℥j.; water, Oiij.; shake the tincture and water together in a bottle, and, after the mixture has stood for twenty-four hours, filter through paper," D. "Camphor, ʒss.; rectified spirit, min. x.; distilled water, Oj.; first rub the camphor with the spirit, then with the water gradually poured in, and strain through linen," L. "Camphor, ℈j.; sweet almonds and pure sugar, of each, ʒss.; water, Oj.; steep the almonds in hot water, and peel them; rub the camphor and the sugar well together in a mortar; add the almonds; beat the whole into a smooth pulp; add the water gradually with constant stirring, and strain," E.) *Camphor julep.* This preparation contains so small a quantity of camphor, that it is used only as a vehicle for the more active stimulants; Dose, f℥j. to f℥ij.

Mistura Camphoræ cum Magnesiâ, E. (Camphor, gr. x.; carbonate of magnesia, gr. xxv.; water, f℥vj.; triturate the camphor and the carbonate of magnesia together, adding the water gradually.) The carbonate of magnesia enables the water to dissolve more of the camphor, and also gives to the mixture slight antacid properties; Dose, f℥ss.

Aqua Camphoræ, UNITED STATES PHARMACOPŒIA. (Camphor, ʒij.; alcohol, min. xl.; carbonate of magnesia, ʒiv.; distilled water, Oij.; rub the camphor first with the alcohol, afterwards with the carbonate of magnesia, and lastly with the water gradually added; then filter through paper.) One fluid ounce contains gr. iij. of camphor; Dose, f℥ss. to f℥iss. Sir James Murray has recently introduced a solution of camphor equal in strength to this, prepared by dissolving camphor in the *Aqua Magnesiæ bicarbonatis*.

Tinctura Camphoræ, D. E. *Spiritus Camphoræ*, L. ("Camphor, in small fragments, ℥j.; rectified spirit, f℥viij.; dissolve the camphor in the spirit," D. "Camphor, ℥v.; rectified spirit, Oij.; dissolve," L. "Camphor in small fragments, ℥iiss.; rectified spirit, Oij.; dissolve the camphor in the spirit," E.) *Camphorated spirit*. For external use chiefly; an excellent application when applied with friction in muscular and rheumatic pains. The camphor is partly precipitated by the addition of water. This tincture is used for the preparation of camphor mixture in the last edition of the Dublin Pharmacopœia.

Essence of Camphor, (Tincture of myrrh, f℥ss.; tincture of camphor, f℥iss.; rectified spirit, f℥iv.; mix.) The tincture of myrrh renders this preparation miscible with water. About min. l. will make a pint of ordinary camphor julep.

Linimentum Camphoræ, D. L. E. ("Camphor, in thin slices, ℥j.; olive oil, f℥iv.; dissolve the camphor in the oil with a gentle heat," D. "Camphor, ℥j.; olive oil, f℥iv.; dissolve," L. "Olive oil, f℥iv.; camphor, ℥j.; rub them together in a mortar until the camphor be dissolved." E.) A stimulating embrocation for deep-seated inflammation, glandular swellings, &c.

Linimentum Saponis, D. L. E. ("Take of castile soap, reduced to powder, ℥ij.; camphor, ℥j.; proof spirit, f℥xvj.; dissolve the soap in the spirit with a gentle heat, then add the camphor, and, when it is dissolved, filter through paper; or, allow it to stand for some time, and decant the clear liniment," D. "Soap, ℥iiss.; camphor, ʒx.; spirit of rosemary, f℥xviij.; distilled water, f℥ij.; mix the water with the spirit; then add the soap and camphor; and macerate, frequently agitating until they are dissolved," L. "Castile soap, ℥v.; camphor, ℥iiss.; oil of rosemary, f℥vj.; rectified spirit, Oij.; digest the soap in the spirit for 3 days; add the camphor and oil, and agitate briskly," E.) *Soap Liniment. Opodeldoc.* A useful stimulating liniment.

Camphor Ointment, (Prepared lard, ℥j.; camphor, reduced to fine powder, ℥ss.; mix intimately.)

INCOMPATIBLES.—The following observations of M. Planche should be borne in mind in prescribing camphor:—With benzoïn, balsam of tolu, ammoniac, and mastich, it forms a soft mass which does not retain the pilular form; camphor is completely deprived of odour by being mixed with assafœtida, galbanum, sagapenum, and balsam of tolu; and the odour is very much weakened by olibanum, mastich, ammoniac, opoponax, benzoïn, and resin of guaiacum.

CAPSICUM.—*Cayenne Pepper* (described in the division *Epispastics*), is not much employed in medicine internally; it is a good stimulant in those forms of dyspepsia which depend on enfeebled and languid digestion, and in the collapse of cholera and of typhus. As a topical remedy it is used with much benefit as an adjunct to stimulating gargles in cynanche maligna, and in all forms of relaxed sore throat. For this purpose either the tincture or *Chili vinegar* is generally employed. The dose of powdered capsicum is from gr. ij. to gr. viij., made into pill with crumb of bread.

Tinctura Capsici, D. L. E. ("Cayenne pods, bruised, ℥iss.; proof spirit, Oj.; macerate for fourteen days, strain, express, and filter," D. "Capsicum, bruised, ʒx.; proof spirit, Oij.; macerate for seven days, express and filter," L. "Capsicum, bruised, or, if percolation be followed, in moderately fine powder, ʒx.; proof spirit, Oij.; digest for seven days, strain, squeeze the residuum, and filter the liquors. This tincture is best prepared by percolation, which may be commenced as soon as the capsicum is made into a pulp with a little spirit," E.) Dose, *internally*, min. xx. to fʒj.; as an adjunct to gargles, fʒiv. to fʒvj. in f℥viij. of an aqueous vehicle.

Chili Vinegar, (prepared by infusing ℥ss. of cayenne pepper in Oij. of white wine vinegar for ten days, and straining,) is added to gargles in the proportion of fʒj. to f℥viij. of infusion of roses.

Cayenne Lozenges allowed to dissolve slowly in the mouth are very useful in the hoarseness and relaxed sore throat of public speakers and singers.

INCOMPATIBLES.—Ammonia; alkaline carbonates; sulphates; acetate of lead; nitrate of silver; and corrosive sublimate.

CARDAMOMUM, D. L. E.—*Cardamoms. The seeds of Elettaria cardamomum*, D. L. *Fruit of Renealmia cardamomum*, E. The various sorts of cardamoms met with in commerce are obtained from the plants above enumerated, or from nearly allied species; but the true officinal or *lesser* cardamom is the product of that indicated by the Dublin and London Colleges. It is a native of Malabar; and belongs to the Natural family *Zingiberaceæ*, and to the Linnæan class and order *Monandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, erect, 6-9 feet high, perennial; Leaves, 1-2 feet long, enveloping the stem with their spongy sheaths; Scapes, several, arising from the base of the stem, 1-2 feet long; Flowers, alternate, on sub-erect racemes, 2-3 inches long, greenish-white with violet stripes; Capsule, oval, 3-celled.

PHYSICAL PROPERTIES.—Cardamoms are the dried fruit, they are gathered in November; as met with in commerce, each fruit is ovato-oblong, obscurely triangular, from three lines to an inch in length, of a pale brownish-yellow colour, coriaceous. They contain numerous, angular, reddish-brown seeds, which have an agreeable aromatic odour, and a grateful pungent taste.

CHEMICAL PROPERTIES.—Cardamoms are composed of volatile oil, fixed oil, fecula, colouring matter, mucilage, and nitrogenous matter; they yield their active principles to water and to alcohol. A cooled decoction is rendered blue by tincture of iodine.

THERAPEUTICAL EFFECTS.—Cardamoms are amongst the most agreeable of the aromatic stimulants, and are commonly employed as adjuvants to more active medicines of this class, or to correct the griping properties of some purgatives.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. v. to gr. xx.

Tinctura Cardamomi, E. (Cardamom seeds, bruised, ℥ivss. ; proof spirit, Oij. ; digest for seven days, strain, squeeze the residuum and filter the liquors. This tincture may be better prepared by the process of percolation in the same way with the tincture of capsicum, the seeds being first ground in a coffee mill.) An aromatic adjunct to mixtures in doses of fʒj. to fʒij.

Tinctura Cardamomi composita, D. L. E. ("Take of cardamom seeds, bruised; caraway seeds, bruised, of each, ℥ss. ; cinnamon, bruised, ℥j. ; cochineal, in powder, ʒij. ; proof spirit, Oiij. ; macerate for fourteen days, strain, express, and filter," D. "Cardamom, bruised ; caraway, bruised ; cochineal, bruised, of each, ℥iiss. ; cinnamon, bruised, ʒv. ; raisins, stoned, ℥v. ; proof spirit, Oij. ; macerate for seven days, express and strain," L. "Cardamom seeds, bruised ; caraway, bruised, of each ʒiiss. ; cochineal, bruised, ʒj. ; cinnamon, bruised, ʒv. ; raisins, ℥v. ; proof spirit, Oij. ; digest for seven days, strain, express strongly the residuum and filter the liquors. This tincture may also be prepared by the method of percolation, if the solid materials be first beat together, moistened with a little spirit, and left thus for twelve hours before being put into the percolator," E.) Dose, fʒj. to fʒij.

INCOMPATIBLES.—Acids; sulphate of iron ; and corrosive sublimate.

CARUI, L. E. CARUM CARUI, SEMINA, D.—*Caraway. The fruit (seeds,* D.) *of Carum carui.* Indigenous ; belonging to the Natural family *Umbelliferæ* (*Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Biennial; Stem, 1–2 feet high ; Leaves, doubly pinnated, cut into linear segments ; Flowers, white or pale flesh-coloured, in dense umbels.

PROPERTIES.—The fruit commonly called *caraway-seeds* does not require description ; it has an agreeable fragrant odour, and a warm aromatic taste. It contains about 5½ per cent. of a light yellow volatile oil, upon which its aromatic properties depend.

THERAPEUTICAL EFFECTS.—Caraway is an agreeable aromatic stimulant much employed by the cook and confectioner as a seasoning and flavouring agent. In medicine it is used for giving warmth to other preparations.

DOSE AND MODE OF ADMINISTRATION.—Of the seeds, ʒj. to ʒij.

Oleum Carui, D. L. E. An article of the Materia Medica in the London Pharmacopœia. "Prepared according to the general directions for distilling volatile oils," D. E. Frequently added to cathartic pills and boluses. Dose, min. j. to min. x. This oil is often adulterated with oil of turpentine, which may be detected by the odour when dropped on a heated spatula.

Aqua Carui, D. L. ("Take of essence of caraway, f℥j.; distilled water, cong. ss.; mix with agitation, and filter through paper," D. "Prepared in a similar manner to Aqua Anethi," L.) Used as an aromatic vehicle for other medicines, and in the flatulent colic of children. Dose, f℥j. to f℥iv.

Essentia Carui, D. *Spiritus Carui*, L. E. ("Take of oil of caraway, f℥j.; rectified spirit, f℥ix.; mix with agitation," D. "Oil of caraway, fʒij.; proof spirit, cong. j.; dissolve," L. "Caraway, bruised, ℔ss.; proof spirit, Ovij.; macerate for two days in a covered vessel, add Oiss. of water, and distil off Ovij." E.) Aromatic and stimulant; Dose, fʒj. to fʒij.

CARYOPHYLLUS AROMATICUS, D. CARYOPHYLLUS, L. E.—*Cloves. Dried undeveloped flowers of Caryophyllus aromaticus*, D. L. E., *—and the volatile oil distilled from them*, L. E. The clove tree is a native of the Molucca Islands, and grows freely in various parts of the East and West Indies. It belongs to the Natural family *Myrtaceæ*, and to the Linnæan class and order *Polyandria Monogynia.*

BOTANICAL CHARACTERS.—Stem, 15–30 feet high; Leaves, opposite, coriaceous, dotted, obovato-oblong; Flowers, whitish, numerous, in terminal or axillary cymes.

PROPERTIES.—Cloves are the undeveloped flowers, consisting of the tubular calyx with the unexpanded corolla, forming a small round ball between its four teeth. Their odour is peculiar, agreeably aromatic, and their taste pungent, somewhat acrid. They consist of 18 per cent. of volatile oil, 6 of an almost tasteless resin (*Caryophyllin*), 13 of tannin, 4 of extractive, 13 of gum, 28 of lignin, and 18 of moisture, (Tromsdorff). The volatile oil is an article of the Materia Medica in the London and Edinburgh Pharmacopœias. As obtained by distillation it consists of two volatile oils, one heavier, the other lighter than water, a mixture of the two forming oil of cloves of commerce. It is at first pale-yellow, but gradually acquires a reddish tint; has the odour and taste of cloves in a marked degree; is very soluble in alcohol, ether, strong acetic acid and the fixed oils; and but very sparingly soluble in water, in which it sinks, its density being obout 1·060. Cloves yield their properties to water and to alcohol.

ADULTERATIONS.—Cloves from which the oil has been procured by distillation are sometimes mixed with good cloves; they may be distinguished by their lightness, and by their not becoming greasy when bruised with the nail. The oil is sometimes adulterated with oil of turpentine, which may be detected by the odour when it is dropped on a heated spatula.

THERAPEUTICAL EFFECTS.—Cloves and their oil are aromatic stimulants, and are employed in medicine as flavouring or corrective adjuncts to other substances; they are extensively used by the cook and confectioner. The oil dropped into the hollow of a carious tooth will in some cases relieve tooth-ache.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. x. to ʒss.

Oleum Caryophylli, D. L. E. ("Prepared according to the general directions for distilling volatile oils," D.) Dose, min. ij. to min. viij.

Infusum Caryophylli, D. L. E. ("Cloves, bruised, ʒij.; boiling water, f℥ix.; infuse for one hour in a covered vessel, and strain; the product should measure about f℥viij." D. "Cloves, bruised, ʒiij.; boiling distilled water, Oj; macerate for two hours in a covered vessel and strain," L. "Cloves, ʒiij.; boiling water, Oj.; infuse for two hours in a covered vessel and strain," E.) An aromatic vehicle for more active medicines. Dose, f℥j. to f℥ij.

INCOMPATIBLES.—*With the infusion.* The mineral acids; lime water; sesqui-salts of iron; sulphate of copper; nitrate of silver; acetate of lead; tartar emetic; and gelatine.

CASSIÆ CORTEX ET OLEUM, E.—*Cassia bark. Oil of Cassia. Bark and volatile oil of the bark of Cinnamomum cassia.* The bark met with in English commerce is procured from the *Cinnamomum aromaticum* (NEES), as indicated by the Edinburgh College. It is a native of China, and is cultivated in Java; it belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia.*

BOTANICAL CHARACTERS.—Stem, arborescent, about 50 feet high; Leaves, oblongo-lanceolate, triple-nerved, the nerves vanishing at the point of the leaf; Petioles, and younger branches, silky-tomentose; Flowers, white, in panicles.

PHYSICAL PROPERTIES.—No account has been given of how cassia-bark is prepared, but it is more than probable that it is by a process similar to that by which cinnamon is procured. It is imported from Singapore in bundles tied with slips of the bamboo cane; resembling cinnamon in appearance, being often sold for it, but it is darker coloured, much thicker, and in simple quills. The odour is not so fragrant as that of cinnamon, and the taste is more pungent and somewhat bitter.

CHEMICAL PROPERTIES.—Cassia bark consists of 0·8 per cent. of volatile oil, 4 of resin, 14·6 of extractive, with woody fibre, &c.; the volatile oil is always imported; it is of a wine-yellow colour, has the odour and flavour of the bark, and is heavier than water, its density being 1·095. Cassia bark yields its active properties to alcohol, but only partially to water The undeveloped flowers of *Cinnamomum aromaticum* are imported under the name of CASSIA BUDS *(Clavelli Cinnamomi).* They have the same properties as the bark, but are not employed in medicine.

ADULTERATIONS.—Oil of cassia is very frequently adulterated, especially on the continent, with oil of cloves. The fraud is easily detected by the addition of fuming nitric acid with which pure oil of cassia merely crystallizes, but if oil of cloves be present it swells up, yields a large quantity of red vapour, and is converted into a thick reddish-brown oil.

THERAPEUTICAL EFFECTS.—Cassia and its preparations are precisely analogous in their operation to cinnamon, for which, as being much cheaper, they are usually substituted; their odour and taste are perhaps not quite so agreeable, and some have held them to be more astringent.

DOSE AND MODE OF ADMINISTRATION.—Of the bark, powdered, gr. x. to ʒss.

Oleum Cassiæ, E. Dose, min. ij. to min. v.

Aqua Cassiæ, E. (Cassia bark, bruised, ℥xviij.; water, cong. ij.; rectified spirit, f℥iij.; mix together and distill off one gallon.) An aromatic vehicle for more active medicines. Dose, fʒj. to f℥iv.

Spiritus Cassiæ, E. (Cassia bark in coarse powder, ℔j.; proceed as for spirit of caraway.) Dose, fʒss to fʒj.

Tinctura Cassiæ, E. (Cassia bark in moderately fine powder, ℥iij. ʒiij.; proof spirit, Oij.; digest for 7 days, strain, express the residuum strongly and filter. This tincture is more conveniently made by percolation, the cassia being allowed to macerate for 12 hours in a little of the spirit before being put into the percolator.) Dose, fʒj. to fʒij.

INCOMPATIBLES.—The sesqui-salts of iron, and gelatine.

CEREVISIÆ FERMENTUM, D. L.—*Yeast. Barm. A vegetable product developed in vinous liquids during the process of fermentation.* Yeast is employed as a stimulant in the advanced stages of typhus and adynamic fevers, and has been highly spoken of in cases where wine is inadmissible in consequence of inflammatory symptoms; it has been also administered in the form of enema in tympanitis. Its principal use at present, however, is for the preparation of a stimulating cataplasm as an application to foul and irritable sores, the fetor of which it corrects, at the same time promoting the separation of the sloughs. It has been used on the continent with great benefit as an application to recent bruises; being simply spread on lint, and the injured parts covered with it; the sooner it is applied after the accident, the more prompt and certain are its effects said to be. The dose of yeast for internal use is two tablespoonfuls every three hours, it may be given with camphor mixture or with peppermint water.

Cataplasma Fermenti, L. (Yeast; water, heated to 100° F., of each, f℥v.; flour, ℔j.; mix the yeast with the water and add the flour, mixing so as to form a cataplasm; place the mixture near a stove until it rises.) This cataplasm should be renewed every six or eight hours; if it occasion much pain, the quantity of flour ought to be increased.

CHLORINII LIQUOR, D. L. CHLORINEI AQUA, E.—*Chlorine water. Concentrated watery solution of Chlorine (with a little sulphate of soda,* E.), D. E. *Solution of Chlorine recently prepared,* L. This solution is in the appendix to the last edition of the London Pharmacopœia, being introduced merely as a test for ascertaining the purity of some medicines.

PREPARATION.—" Take of peroxide of Manganese, in fine powder, half an ounce; muriatic acid of commerce, three fluid ounces; distilled water, twenty-four ounces; introduce the peroxide of manganese into a gas bottle, and, having poured upon it the muriatic acid diluted with two ounces of water, apply a gentle heat, and, by suitable tubes, cause the gas, as it is developed, to bubble through two additional ounces of the water, placed in an intermediate small phial, and then to pass to the bottom of a three-pint bottle, containing the remainder of the water, and whose mouth is loosely plugged with tow. When the air has been entirely displaced by the chlorine, let the bottle be disconnected from the apparatus in which the gas is generated, corked loosely, and shaken until the chlorine is absorbed. It should be now transferred to a pint bottle with a well-ground glass stopper, and preserved in a cool and dark place," D. " Hydrochloric acid, f℥j.; binoxide of manganese, powdered, ʒij.; distilled water, Oss.; mix the acid and binoxide in a retort; and transmit the chlorine into the water as long as any comes over, L." " Muriate of soda, gr. lx.; sulphuric acid (commercial), fʒij.; red oxide of lead, 350 grains; water, f℥viij.; triturate the muriate of soda and oxide together; put them into the water contained in a bottle with a glass stopper; add the acid, agitate occasionally till the red oxide becomes almost white. Allow the insoluble matter to subside before using the liquid," E.

PHYSICAL PROPERTIES.—Prepared according to the directions of the Dublin Pharmacopœia, this is a yellowish-green liquid, with the suffocating odour of chlorine, and an acrid styptic taste.

CHEMICAL PROPERTIES.—This solution contains about twice its bulk of chlorine gas. It bleaches all vegetable colours. By long keeping, particularly if exposed to light, Chlorine water is converted into a weak solution of muriatic acid, and oxygen is evolved: in consequence of these disadvantages, the Edinburgh Pharmacopœia contains a formula, given above, by which an aqueous solution of chlorine may be obtained in a few hours. It contains a small quantity of sulphate of soda dissolved, which, however, can in no wise interfere with its employment in medicine; and a white sulphate of lead remains as an insoluble precipitate in the bottom of the bottle. Chlorine water is characterised by its bleaching properties, by its power of dissolving leaf gold, and by its not effervescing with carbonate of lime.

THERAPEUTICAL EFFECTS.—Taken in large quantity, chlorine water acts as a powerful irritant poison. In medicinal doses it operates as a stimulant, and as such is employed with benefit in the advanced stages of typhus fevers and of epidemic dysentery, in malignant sore throat, and in chronic diseases of the liver. Chlorine gas diluted with common air has been inhaled in chronic bronchitis and in phthisis, but although the symptoms are often ameliorated under its employment, the benefit produced is not permanent. Externally, chlorine water has been used, largely diluted, as a wash to foul and indolent ulcers and for chronic cutaneous diseases, in the form of gargle in cynanche maligna, and as a local bath in hepatitis.

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒij. in as many ounces of water sweetened with syrup. For external use fʒj. may be diluted with f℥j. of water.

INCOMPATIBLES.—Nitrate of silver ; and the acetates of lead.

In poisoning with chlorine water the best antidote is albumen, as white of egg, or in its absence, milk or flour.

CINNAMOMUM ZEYLANICUM, D. CINNAMOMUM, L. E. CINNAMOMI OLEUM, L. E.—*Cinnamon. Bark of Cinnamomum zeylanicum,* D. *Bark, and volatile oil of Cinnamomum zeylanicum,* L. E. The cinnamon tree is a native of Ceylon and Malabar ; it belongs to the Natural family *Lauraceæ,* and to the Linnæan class and order *Enneandria Monogynia.*

BOTANICAL CHARACTERS.—Stem, arborescent, about 30 feet high ; Branches, obscurely 4-cornered ; Leaves tapering into a blunt point, 3-nerved, smooth, and perfectly free from down, as also are the leaf-stalks ; Flowers, in terminal and axillary stalked panicles.

PREPARATION.—The inner bark of the branches, and the volatile oil obtained from it, are used in medicine. The bark is taken from branches which are three years old, they are lopped off the trees in the rainy season, and the bark immediately removed by making two opposite longitudinal incisions ; the epidermis and green pulpy matter are afterwards scraped off, the smaller pieces introduced into the larger ones, and dried in the sun, the pieces contracting, as they dry, into the form of quills. The oil, which is an article of the Materia Medica in the London and Edinburgh Pharmacopœias, is obtained by macerating the coarser pieces of bark and the trimmings in sea-water for 48 hours, and submitting them to distillation.

PHYSICAL PROPERTIES.—Cinnamon is imported from Ceylon in bales and in boxes, some is also brought from Malabar. Three sorts are usually distinguished in commerce ; the finest is in splintery rolls consisting of compound quills, the smaller being inclosed within the larger, from 30 to 40 inches in length ; the pieces are very thin, generally not much thicker than writing paper, of a light brownish-yellow colour, smooth on the surface, with a splintery fracture. The odour is aromatic and fragrant, and the taste warm, sweetish, and feebly astringent. The inferior kinds are in coarser quills, not so much rolled, of a darker brown colour, and with a less agreeable odour and taste. Oil of cinnamon is imported from Ceylon ; it is of a pale wine-yellow colour, becoming darker by age, and possesses intensely the peculiar odour and taste of the bark ; it is heavier than water, its density varying from 1·038 to 1·041 (Christison).

CHEMICAL PROPERTIES.—Cinnamon bark consists of volatile oil, tannin, mucilaginous extractive, resin, an acid, colouring matter, and woody fibre. It yields its properties partially to water but more completely to alcohol. The volatile oil constitutes about 6 parts in a thousand of the fresh bark ; it consists of a light and heavy oil, which may be obtained separate by distillation. The composition of oil of cinnamon is $C^{20} H^{11} O^{2}$ (Mulder) ; by exposure to the air it absorbs oxygen, and is converted into a mixture of *cinnamic acid*, two peculiar resins and water. Strong nitric acid converts oil of cinnamon into a solid crystalline mass.

ADULTERATIONS.—Cinnamon bark may be distinguished by its physical properties from cassia bark which is often sold for it ; in the London Pharmacopœia it is characterised as "being thin, much quilled, the smaller quills being included in the larger." The oil may be distinguished from oil of cassia by its more fragrant odour, and by the taste of the latter being more acrid and burning. The tests of the Edinburgh Pharmacopœia for the purity of oil of cinnamon apply equally to oil of cassia :—"Cherry-red when old ; wine-yellow when recent ; odour purely cinnamomic ; nitric acid converts it nearly into a uniform crystalline mass."

THERAPEUTICAL EFFECTS.—Cinnamon is an excellent warm stimulant, and in consequence of its agreeable flavour is very much employed in medicine, principally as an aromatic adjunct to other substances. The watery solution is very commonly used as a vehicle for more active medicines. The oil is not much employed, but it forms an excellent addition to cathartic pill masses.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.

Oleum Cinnamomi, D. L. E. ("Prepared according to the general directions for distilling volatile oils," D.) Dose, min. j. to min. v.

Aqua Cinnamomi, D. L. E. ("Take of essence of cinnamon, f℥j. ; distilled water, cong. ss. ; mix with agitation, and filter through paper," D. "Prepared in a similar manner to *Aqua Anethi*," L. "Cinnamon, bruised, ℥xviij. ; water, cong. ij. ; rectified spirit, f℥iij. ; mix and distil off one gallon," E.) An agreeable vehicle for other medicines. Dose, fʒj. to f℥iv.

Essentia Cinnamomi, D. *Spiritus Cinnamomi*, L. E. ("Take of oil of cinnamon, f℥j. ; rectified spirit, f℥ix. ; mix with agitation," D. "Oil of cinnamon, fʒij. ; proof spirit, cong. j. ; dissolve," L. "Cinnamon, in coarse powder, ℔j. ; proceed as for spirit of caraway," E.) Dose, *Dublin*, min. xx. to min. xxx. ; *London and Edinburgh*, fʒj. to f℥ss.

Tinctura Cinnamomi, L. E. ("Cinnamon, bruised, ℥iiiss. ; proof spirit, Oij. ; macerate for seven days and filter," L. "Cinnamon, in moderately fine powder, ℥iiiss. ; proof spirit, Oij. ; proceed by percolation or digestion as directed for tincture of cassia," E.) Dose, fʒj. to f℥ss.

Tinctura Cinnamomi composita, D. L. E. ("Take of cinnamon, bruised, ℥ij. ; cardamom seeds, bruised, ℥j. ; ginger, bruised, ℥ss. ; proof spirit, Oij. ; macerate for fourteen days, strain, express, and filter," D. "Cinnamon, bruised, ℥j. ; cardamom, bruised, ℥ss. ; long pepper, powdered ; and ginger, sliced, of each, ʒiiss. ; proof spirit, Oij. ; macerate for seven days and filter," L. "Cinnamon, in coarse powder (fine if percolation be followed) ; and cardamom seeds, bruised, of each, ℥j. ; long pepper, ground finely, ʒiij. ; proof spirit, Oij. This tincture is best prepared by percolation as directed for the compound tincture of cardamom ; but it may also be made by digestion for 7 days, straining, and expressing the liquor, and then filtering it," E.) Dose, fʒj. to fʒij.

Pulvis Aromaticus, D. E. *Pulvis Cinnamomi compositus*, L. ("Take of cinnamon; ginger, of each, ℥ij. ; cardamom seeds, freed from their capsules; nutmegs, of each, ℥j. ; rub each separately to powder, and, having mixed them by trituration, pass through a fine sieve. When prepared, the powder should be kept in well-stopped bottles," D. "Cinnamon, ℥ij. ; cardamom seeds, ℥iss. ; ginger, ℥j. ; long pepper, ℥ss. ; rub together to a very fine powder," L. "Cinnamon ; cardamom seeds ; and ginger, of each, equal parts ; reduce to a very fine powder, and keep in well-closed glass vessels," E.) Dose, gr. v. to gr. xx.

Confectio Aromatica, D. L. ("Take of aromatic powder, ℥v. ; dried saffron in fine powder, ℥ss. ; oil of cloves, fʒss. ; simple syrup, f℥v. ; clarified honey, *by weight*, ℥ij. ; rub the aromatic powder with the saffron, add the syrup and honey, and beat them together till thoroughly mixed ; lastly add the oil of cloves," D. "Cinnamon ; nutmegs, of each, ℥ij. ; cloves, ℥j. ; cardamoms, ℥ss ; saffron, ℥ij. ; prepared chalk, ℥xvj. ; sugar, ℔ij. ; distilled water, a sufficiency ; rub the dry ingredients together to a very fine powder, and keep them in a close vessel, and whenever the confection is be used, add to every ounce of the powder two fluid drachms of water, and mix until they are thoroughly incorporated," L.) Stimulant, carminative and antacid, frequently used in mild cases of diarrhœa.

Dose, gr. xx. to ʒj. ; substances incompatible with chalk should not be prescribed in combination with the London preparation.

Electuarium Aromaticum, E. (Aromatic powder, one part ; syrup of orange peel, two parts ; mix and triturate into a uniform pulp.) Dose, gr. x. to gr. xl.

COCCULUS, E.—*Cocculus Indicus. Fruit of Anamirta cocculus.* A native of Malabar and the eastern islands of India ; belonging to the Natural family *Menispermaceæ*, and to the Linnæan class and order *Diœcia Monadelphia.*

BOTANICAL CHARACTERS. A strong, climbing shrub ; Bark, corky, ash-coloured, cracked ; Leaves, roundish, leathery, smooth, six inches long, and as many broad ; Flowers, in lateral compound racemes ; drupes, 2–3 globose.

PHYSICAL PROPERTIES.—The fruit commonly known under the name of Cocculus Indicus, is roundish, about the size of a large pea, with a dark-brown wrinkled perisperm, within which is the bivalved, one-celled fruit; the kernel is white and oily, and does not completely fill the shell. It is void of odour but has an intensely bitter taste.

CHEMICAL PROPERTIES.—The nucleus contains a peculiar, white, crystalline acid which has been named *Picrotoxin*, resin, gum, a fatty acid, and other unimportant substances; the pericarp contains another peculiar principle which has been named *Menispermin*, and which possesses properties very nearly similar to those of Picrotoxin, the latter being the active principle of the drug. Picrotoxin is soluble in 150 parts of temperate water, 25 of boiling water, 2 of pure ether, and 3 of alcohol; but is insoluble in the fixed and volatile oils; its composition was stated to be $C^{12} H^7 O^5$; but more recent examination has proved it to be a salifiable base containing nitrogen. Cocculus Indicus yields its active properties to alcohol, and but very imperfectly to either cold or boiling water.

ADULTERATIONS.—As met with in commerce, either from having been gathered before being fully ripe or from long keeping, the kernel is often completely dried up, so as to leave the shell nearly if not quite empty. The *Edinburgh College* therefore directs "that the kernels should fill at least two-thirds of the fruit."

THERAPEUTICAL EFFECTS.—Cocculus Indicus is a powerful stimulant, in large doses producing death with tetanic convulsions and coma. It is used in India to poison fish; and in this country has been occasionally employed nefariously by brewers to give an artificial strength to beer. In medicine it is only employed externally to destroy vermin, and by some physicians as a stimulating application in the form of ointment to furfuraceous eczema and porrigo of the scalp. Picrotoxin is highly poisonous; it may be used as a substitute for the drug.

PHARMACEUTICAL PREPARATIONS.—The following are the preparations employed:—

Unguentum Cocculi, E. (Take any convenient quantity of Cocculus Indicus, separate and preserve the kernels, beat them well in a mortar, first alone, and then with a little axunge; and then add axunge till it amounts altogether to five times the weight of the kernels.)

Unguentum Picrotoxin, JAGER. (Picrotoxin, gr. x.; axunge, ℥j.; mix intimately.) These ointments have been applied in small quantities to the scalp night and morning in the cases above mentioned, and the head well cleansed with soap and warm water at least once daily. They should be used with great caution when the skin is not entire, as danger may arise from absorption. At present they have nearly, and in my opinion quite justly, fallen into disuse; and consequently Cocculus Indicus has been omitted from the last editions of the Dublin and London Pharmacopœias.

CORIANDRUM, L. E. CORIANDRUM SATIVUM, SEMINA, D.—*Coriander. The fruit (seeds,* D.) *of Coriandrum sativum.* A native of the south of Europe, scarcely indigenous; belonging to the Natural family *Umbelliferæ (Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Annual; Stem, erect, leafy, about 18 inches high; Leaves, scarcely stalked, all bipinnate, and cut; Flowers, white, often with a reddish tint.

PROPERTIES.—The fruit commonly called *coriander-seed* is round, a little larger than white pepper, finely ribbed, of a brownish-yellow colour. When ripe it has an agreeable aromatic odour, and a warm peculiar taste. Its properties depend on volatile oil, of which it contains 4·7 parts in a thousand.

THERAPEUTICAL EFFECTS.—Coriander is employed in medicine as a flavouring adjunct in some officinal preparations, but is not used alone. The dose of the fruit is from ʒss. to ʒj.

CUMINUM, E. CYMINUM, L.—*Cummin. The fruit of Cuminum cyminum.* A native of Greece and Egypt, belonging to the Natural family *Umbelliferæ (Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

The fruit of this plant, commonly called *cummin-seed,* possesses aromatic stimulant properties, which depend on the presence of volatile oil; but there are scarcely sufficient grounds for retaining it in the London and Edinburgh Pharmacopœias, when we have so many more agreeable medicines with precisely analogous properties. Dose, of the fruit, gr. x. to ʒss.

Emplastrum Cumini, L. (Cummin; carraway; bay berries, of each, ℥iij.; prepared burgundy pitch, ℔iij.; wax, ℥iij.; olive oil; water, of each, f℥iss.; to the pitch and wax, melted together, add the dry ingredients rubbed to powder, the oil, and the water; then evaporate to a proper consistence.) An aromatic and discutient plaster, often applied with good effect in flatulent and nervous dyspepsia over the region of the stomach.

DAUCI RADIX, D. E. CAROTA, L.—*The common carrot. The root (fresh root,* L.) *of Daucus carota (var. sativa,* L. E.) Indigenous; belonging to the Natural family *Umbelliferæ (Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Root, slender, yellowish, becoming thick and succulent by cultivation *(var. sativa)*; Stem, 2-3 feet high, hispid; Leaves, pinnatisect; Flowers, in large umbels, white, except the centre neutral one, which is blood-red.

PROPERTIES.—The fruit—which has been omitted from the last edition of the London Pharmacopœia—commonly called *carrot-seed,* is obtained from the uncultivated variety; it is small, compressed, ovate, of a brown colour, fringed with a row of whitish spines; having a strong aromatic odour and taste which depend on volatile oil. The root which is obtained from the cultivated carrot is too well known to require description. It contains a trace of volatile oil, with some fixed oil, a peculiar, ruby-red crystalline substance *(Carotin)*, uncrystallizable sugar, fecula, albumen, malic acid, &c.

THERAPEUTICAL EFFECTS.—The fruit of the wild carrot is carminative and stimulant, and by many is held to be diuretic; it is scarcely ever used at present. Carrot-root when boiled forms one of the most nutritive of our esculent vegetables. In medicine it is only used as an external application in the form of poultice to stimulate foul, indolent, and gangrenous sores; it corrects the fetor, and promotes the separation of the sloughs.

DOSE AND MODE OF ADMINISTRATION.—Of the fruit, gr. xx. to ℈j. A carrot poultice is prepared by boiling the root in water until it becomes soft enough to form a cataplasm.

ELECTRICITY. GALVANISM. MAGNETIC ELECTRICITY. These powerful agents in the treatment of disease require some short notice here. They operate either as general or local stimulants according to the manner in which they are applied: under their influence the vascular and nervous systems, more especially the latter, being excited, the pulse increased in frequency, the muscles stimulated to involuntary action, and the general secretions augmented. The diseases, then, in which their use is indicated are those of debility; hence they are employed in all forms of paralysis of the nerves, both of sensation and of motion, when uncomplicated with any lesion of, or determination of blood to, the cerebro-spinal system; as in some forms of nervous deafness and of amaurosis, in long-standing cases of paraplegia and hemiplegia, in paralysis of the muscles of the fore-arm from the poison of lead or of mercury, in obstinate constipation, in the insensible stage of poisoning with opium, and in asphyxia. In suppression of the menstrual discharge, arising from loss of tone in the uterine organs, electrical shocks passed through the pelvis, from the sacrum to the pubis, are frequently productive of great benefit. In the loss of muscular power attendant on chronic rheumatism, and in chorea and other allied convulsive disorders, the employment of electricity often proves serviceable also. My own experience of its use as a remedial agent leads me to place more reliance on its employment in *local* than in *general* paralysis—more particularly when a single muscle or a certain class of muscles has become paralysed from any special cause. Thus I have derived peculiar benefit from its use in that particular form of paralysis of the muscles of the forearm, which is produced by the action of lead, and which is so frequent a sequence of painter's colic; as also in those cases where a single muscle becomes paralysed, either from exposure to a draught of cold air, or from continued pressure on the nerve by which the muscle is supplied.* The entire subject of the therapeutical applications of the various forms of electricity has been recently carefully and ably studied by M. Duchenne (de Boulogne), and several memoirs on the subject published by him; amongst others, two in the 14th and 15th volumes of the *Dublin Quarterly Journal of Medical Science*, which will well repay an attentive perusal.

The different forms of electricity may in general be indifferently applied, but *galvanic* and *magnetic* electricity possess the advantages of being more readily employed, of not being interfered with by the state of the atmosphere, of the effects produced being more under control, and of the facility with which they may be applied to the different parts of the body; consequently these forms of electricity are in the present day most generally used.

For the application of common electricity, Leyden jars charged with the cylindrical or plate machine are employed, with the usual directors for discharging them; the patient may or may not be placed on an insulating stool or chair, according to the effect which it is wished to produce.

Galvanic electricity is applied by means of the usual galvanic troughs and insulated directors; the apparatus is objectionable in consequence of its not being very portable, and also from its requiring the use of acids to bring it into operation.

Magnetic-electricity is the most convenient and simple mode of employing this agent in the practice of medicine; it is most readily applied by means of an instrument consisting of a small battery, on Smee's principle, in connexion with a frame on which is fixed an upright or horizontal straight magnet, surrounded by a bundle of iron wires, round which are coiled some thousand yards of insulated large and small copper wire, divided into seven different portions, each of which terminates separately in a small brass knob, brought up through the bottom of the frame: by means of which arrangement we can readily augment or diminish the power of the current that is being administered. The shocks are produced by the continuity of the stream of electricity being broken by the alternate attraction and repulsion, by the magnet, of a piece of soft iron, which is kept in contact with a platinized screw by means of a piece of watch spring. More recently an excellent and simply constructed instrument, cheap in price, has been introduced from America, which possesses the great advantage of not requiring a fluid battery to put it into operation:

There is one objection to the use of these instruments as pointed out by the late Dr. Golding Bird, namely, that a series of positive or negative currents in a definite direction cannot be administered by means of them, inasmuch as negative and positive electricity are alternately discharged by each conducting wire. To remedy this defect in construction, that physician contrived a machine which he termed the "single-current electro-magnetic machine," of which a full description is given in his lectures on Electricity and Magnetism. But for my own part I regard the *stimulant* action of magnetic electricity, so to say, as its active principle, and therefore I cannot see the validity of his objection to the alternating current.

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* See Edinburgh Monthly Journal of Medical Science, vol. 6, p. 225.

The good effects of any of the forms of electricity require a long time for their development, and its use should be consequently persevered in for some time, and not despaired of if immediate relief is not experienced. Care must, however, be taken to regulate the force or intensity of the shock, as over-excitement from electricity proves in general highly injurious in those very cases in which its employment, if properly regulated, is attended with the greatest service. In fine it should be always borne in mind, that electricity is only to be considered as an auxiliary to other modes of treatment.

ELEMI, D. L. E.—*Elemi. The concrete resinous exudation from one or more unascertained plants,* D. E. *Concrete turpentine from an unascertained plant,* L. It is quite uncertain from what plant this substance is obtained, and even its commercial route is involved in much obscurity; what is met with in this country is brought chiefly from Holland. American elemi is obtained from the *Icica icicariba,* a plant belonging to the Natural family *Amyridaceæ.* The term elemi is applied to three or four resins of very different appearance, and much of what is sold under this name appears to be a very composite substance. It is only employed in medicine in the form of ointment as a stimulating dressing to old and indolent ulcers.

Unguentum Elemi, D. L. ("Take of resin of elemi, ℥iv.; ointment of white wax, ℔j.; melt them together, strain through flannel, and stir the mixture constantly until it concretes," D. "Elemi, ℥iij.; turpentine, ℥iiss.; suet, ℥vj.; olive oil, f℥iss.; melt the elemi with the suet; then remove them from the fire, and immediately mix with them the turpentine and the oil, and afterwards press through a linen cloth," L.)

FŒNICULUM, L. E. FŒNICULUM OFFICINALE, SEMINA, D.—*Fennel. Fruit (seeds,* D.*) of Fœniculum officinale,* D. E. *Fruit of Fœniculum dulce,* L. *Fœniculum vulgare* (*Anethum fœniculum,* LINNÆUS) is an indigenous plant; belonging to the Natural family *Umbelliferæ* (*Apiaceæ,* Lindley), and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Biennial; Stem, 3-4 feet high, fistulose; Leaves, much divided, with very slender segments; Flowers, dark yellow.

PROPERTIES.—The fruit commonly called *fennel-seed,* is oval, about two lines long and one broad, of a dark-brown colour ; it has an agreeable aromatic odour, and a warm sweetish, somewhat acrid taste. These properties depend on a volatile oil which it contains. The oil of fennel of the shops is usually obtained from a cultivated variety of *Fœniculum vulgare,* which in consequence of the sweeter taste of the fruit is known under the name of *Fœniculum dulce,* and is therefore officinal in the last edition of the London Pharmacopœia.

THERAPEUTICAL EFFECTS.—Fennel is a warm aromatic stimulant, but is not much used in the present day; it may be employed in the same cases as anise and caraway.

DOSE AND MODE OF ADMINISTRATION.—In substance, ʒss. to ʒj.

Oleum Fœniculi, D. L. E. An article of the Materia Medica in the London Pharmacopœia. "Prepared from the fruit according to the general instructions for obtaining volatile oils," D. E. Dose, min. ij. to min. x.

Essentia Fœniculi, D. (Take of oil of fennel, f℥j. ; alcohol, f℥ix. ; mix with agitation.) Dose, min. xx. to min. xxx.

Aqua Fœniculi, D. E. (Prepared in the same way as Aqua Carui, D., as Aqua Anethi, E.) An aromatic vehicle for other medicines; Dose, f℥j. to f℥iv.

INULA, L.—*Elecampane. Root of Inula helenium.* Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ,* Lindley), and to the Linnæan class and order *Syngenesia Superflua.*

BOTANICAL CHARACTERS.—Root, thick, branching, perennial; Stem, 3–5 feet high, branched ; Leaves, amplexicaul, ovate, wrinkled, downy beneath ; Flowers, large, terminal, bright-yellow.

PROPERTIES.—Elecampane-root when dried has an aromatic odour, and a warm bitter taste. It consists of bitter extractive, soft resin, elecampane-camphor *(Helenin),* a variety of starch named *Inulin.* a trace of volatile oil, &c. It yields its active properties partially to water, but more completely to alcohol.

THERAPEUTICAL EFFECTS.—Elecampane is an aromatic stimulant, producing vomiting in large doses. It is scarcely ever used in medicine, and might be well spared from the Materia Medica Dose, ℈j. to ʒij.

LAURUS, L.—*Sweet-bay berries. Fruit of Laurus nobilis.* A native of the South of Europe, cultivated in our shrubberies ; It belongs to the Natural family *Lauraceæ,* and to the Linnæan class and order *Enneandria Monogynia.*

BOTANICAL CHARACTERS.—A small tree ; Leaves, alternate, lanceolate, coriaceous ; Flowers, in axillary umbels, yellowish ; Fruit, a bluish-black, oval berry, one-seeded, about the size of a small nut.

PROPERTIES.—The leaves and fruit have an aromatic, rather agreeable odour, and a warm, somewhat bitter taste. These properties depend on a volatile oil which may be obtained by distillation. The berries contain also about 12 per cent. of butyraceous fixed oil, which for some years back has been imported from Trieste.

THERAPEUTICAL EFFECTS.—The leaves, berries, and oils of the sweet bay are aromatic stimulants; but are scarcely ever used in medicine. The fixed oil was formerly employed as a local stimulant in rheumatic and neuralgic pains, and is used as such with great benefit on many parts of the continent in the present day. The leaves and berries may be administered in the form of infusion, prepared by infusing ʒiss. of either, bruised, in f℥xij. of boiling water. Dose, f℥ss. to f℥ij.

LAVANDULA, E. LAVANDULA VERA, FLORES, D. LAVANDULÆ OLEUM *(Anglicanum)*, L.—*Lavender. Flowers of Lavandula vera*, D. E. *Oil distilled in England from the flowers of Lavandula vera*, L. It is from *Lavandula vera* (De Candolle) that the flowers are procured for medical use; this is a native of the central parts of Europe, and is cultivated in our gardens; it belongs to the Natural family *Labiatæ* (*Lamiaceæ*, Lindley,) and to the Linnæan class and order *Didynamia Gymnospermia.*

BOTANICAL CHARACTERS.—Stem, shrubby, 1–2 feet high; Leaves, oblong-linear or lanceolate, quite entire; Flowers, purplish-gray, in whorls of 6–10 flowers, in interrupted spikes. *Lavandula vera* may be readily distinguished from *Lavandula spica*, by its taller stature, its narrower leaves, and the absence of bracts.

PHYSICAL PROPERTIES.—The flowers are gathered when in full bloom, and dried in the shade: they have a peculiar fragrant odour, and a warm, somewhat bitter, aromatic taste.

CHEMICAL PROPERTIES.—They contain volatile oil, tannin, bitter extractive, and woody fibre. The oil, *Oleum Lavandulæ*, is obtained by the usual process of distillation; it is of a pale-yellow colour, has the peculiar fragrant odour of the flowers, and a warm aromatic taste. One pound of flowers yields about two drachms of oil. Its density according to Zeller is between ·870 and ·890; its composition $C^{15}H^{14}O^{2}$. Lavender flowers yield their properties completely to alcohol, but only partially to boiling water.

THERAPEUTICAL EFFECTS.—Lavender is a very agreeable aromatic stimulant, and its officinal preparations are consequently much employed for giving warmth and flavour to other medicines.

DOSE AND MODE OF ADMINISTRATION.—The flowers in powder are added to sternutatories on account of their agreeable odour.

Oleum Lavandulæ, D. L. E. Dose, min. ij to min. v.

Spiritus Lavandulæ, E. (Fresh lavender, ℔iiss.; rectified spirit, cong. j.; mix, and with the heat of a vapour-bath distil over Ovij.) Used by the Edinburgh College in the preparation of the following:—

Tinctura (Spiritus, E.) Lavandulæ composita, D. L. E. ("Take of oil of lavender, fʒiij. ; oil of rosemary, fʒj. ; cinnamon, bruised, ℥j. ; nutmeg, bruised, ʒss ; cloves, bruised; cochineal, in powder, of each, ʒij. ; rectified spirit, Oij. ; macerate for fourteen days, strain, express, and filter," D. "Oil of lavender, fʒiss. ; oil of rosemary, min. x. ; cinnamon, bruised ; nutmeg, bruised, of each, ʒiiss. ; sandal-wood, sliced, ʒv. ; rectified spirit, Oij. ; macerate the cinnamon, nutmeg and sandal-wood in the spirit for seven days ; then express and filter and dissolve the oils in the filtered tincture," L. "Spirit of lavender, Oij. ; spirit of rosemary, f℥xij. ; nutmegs, bruised, ℥ss. ; cinnamon, in coarse powder, ℥j. ; cloves, bruised, ʒij. ; red sandal-wood shavings, ʒiij. ; macerate for seven days and strain through calico," E.). This preparatian, generally known as *Lavender Drops,* is used as a cordial and stomachic to relieve nausea, flatulence, lowness of spirits, &c. Dose, min. xxx. to fʒij. in water, or dropped on white sugar.

INCOMPATIBLES.—Sulphate of iron.

LIMONUM CORTEX ET OLEUM, D. L. E.—*The external rind (fresh and dried,* D. L.) *of the fruit, and the volatile oil obtained (by expression,* L.) *from the rind of Citrus limonum,* D. L. E. *Lemon peel, and oil of lemons.* The lemon tree has been described in the division *Refrigerants. Oil of lemons* is obtained from the rind either by distillation or expression ; the latter is the method usually followed ; it is imported from Portugal and from France. It has a pale greenish-yellow colour, the fragrant odour of lemons, and a pungent aromatic taste ; density, ·850. Oil of lemons has the probable composition C^5H^4, being like oil of turpentine composed of two isomeric oils, *citrene* and *citrylene. Lemon peel* is of a yellow colour, has an agreeable aromatic odour, and a warm, somewhat bitter taste, both of which are much injured by drying. Care must be taken in peeling lemons to remove the outer yellow rind only ; it should be dried without artificial heat, and is best preserved laid in alternate layers with sugar, and kept in well-closed bottles. Lemon peel yields its properties to both alcohol and water.

THERAPEUTICAL EFFECTS.—Oil of lemons is an aromatic stimulant, only used internally to give an agreeable flavour to other medicines ; as a topical remedy it is highly praised by the Germans as a stimulant in rheumatic and scrofulous ophthalmia, for which purpose it is dropped into the eye. Lemon peel is employed as a flavouring ingredient in infusions.

DOSE AND MODE OF ADMINISTRATION.—In the following forms only :

Oleum Limonum, D. L. E. Dose, min. ij. to min. v.

Tinctura Limonis, D. *Tinctura Limonum,* L. ("Take of fresh lemon peel, cut thin, ℥v. ; proof spirit, Oj. ; macerate for fourteen days, strain, express, and filter," D. "Fresh lemon peel, ʒiiiss. ;

proof spirit, Oij. ; macerate for seven days, express, and filter," L.) Dose, fʒss. to fʒij. ; an agreeable adjunct to other medicines ; it is used by the Dublin College in the preparation of syrup of citric acid.

INCOMPATIBLES.—The mineral and vegetable acids ; and lime water.

MASTICHE, D. L. E.—*Mastich. The resin (concrete resinous exudation,* E.) *of Pistacia lentiscus.* A native of the South of Europe and of the Levant ; belonging to the Natural family *Anacardiaceæ*, and to the Linnæan class and order *Diœcia Pentandria.*

Mastich exudes from incisions made into the tree ; it is in small, irregular, yellowish tears, which have a faint, agreeable odour, and a warm taste. It is scarcely ever used at present, but was at one time much employed as an ingredient in *dinner pills.* It enters into the composition of the *Tinctura Ammoniæ composita,* L. (see page 371.)

MELISSA, E.—*Common Balm. Herb of Melissa officinalis.* A native of Central Europe, cultivated in our gardens ; it belongs to the Natural family *Labiatæ (Lamiaceæ,* Lindley,) and to the Linnæan class and order *Didynamia Gymnospermia.*

BOTANICAL CHARACTERS.—Herbaceous ; Leaves, broadly ovate, crenate, hairy above, smooth beneath ; Flowers, white, in one-sided axillary whorls, shortly pedunculated.

PROPERTIES.—In the recent state the whole herb has an aromatic, citron-like odour, much of which is lost by drying ; the taste is warm and bitter. It contains volatile oil, resin, bitter extractive, a trace of tannin, gum, &c. It yields its properties to boiling water by infusion.

THERAPEUTICAL EFFECTS.—Balm is a mild aromatic stimulant, at present never used except as a domestic remedy.

Infusum Melissæ, (Prepared by infusing ℥ij. of the fresh herb in Oss. of boiling water for a quarter of an hour.) *Balm tea* is given in doses of from f℥ij. to f℥iv.

INCOMPATIBLES.—Sulphate of iron ; acetate of lead ; and nitrate of silver.

MENTHA PIPERITA, D. L. E.—*Peppermint. Herb (Fresh and dried flowering herb,* L.) *of Mentha piperita.* Indigenous ; belonging to the Natural family *Labiatæ* (*Lamiaceæ,* Lindley), and to the Linnæan class and order *Didynamia Gymnospermia.*

BOTANICAL CHARACTERS.—Root, creeping ; Stem, smooth, quadrangular ; Leaves, ovato-lanceolate, strongly serrated, acute, slightly hairy ; Flowers, violet-coloured, in lax, short, interrupted spikes ; Bracteas lanceolate.

PROPERTIES.—Peppermint has an aromatic, to most persons agreeable, odour, and a warm pungent taste, leaving a peculiar impression of coldness on the mouth which is most marked during inspiration. These properties are due to a large quantity of volatile oil which exists in small vesicles or glands, chiefly in the leaves. This oil, *Oleum Menthæ piperitæ,* D. L. E.—an article of the Materia Medica in the London Pharmacopœia—is obtained by the usual process of distillation ; the quantity procured varies from a 200th to a 320th ; it is limpid and colourless, but acquires a greenish tint from age, and has the odour and taste of the plant in an intense degree. It is soluble in alcohol, and when agitated with water imparts to it both odour and taste. Its density is ·902, and its composition $C^{20}H^{20}O^{2}$.

THERAPEUTICAL EFFECTS.—Peppermint is perhaps the most powerful aromatic stimulant of the Labiate plants ; and in consequence of its agreeable odour and taste is very generally used to disguise nauseous medicines. It is also much employed to relieve sickness of the stomach, heartburn and flatulent colic.

DOSE AND MODE OF ADMINISTRATION.—Of the volatile oil, min. ij. to min. v. dropped on sugar.

Aqua Menthæ piperitæ, D. L. E. ("Take of essence of peppermint, f℥j. ; distilled water, cong. ss. ; mix with agitation, and filter through paper," D. "Peppermint, dried, ℔ij. ; water, cong. ij. ; distil a gallon. If the fresh herb is employed, double the quantity should be used. This water may be prepared more quickly from the oil of peppermint in the same manner as the *Aqua Anethi,*" L. "Peppermint, ℔iv. if fresh, (℔ij. if dry) ; water, cong. ij. ; rectified spirit, f℥iij. ; mix, and distil one gallon," E.) Employed to relieve flatulent colic, but chiefly as a vehicle for other medicines ; Dose, f℥j. to f℥ij.

Essentia Menthæ piperitæ, D. *Spiritus Menthæ piperitæ,* L. *Spiritus Menthæ,* E. ("Take of oil of peppermint, f℥j. ; stronger spirit, f℥ix. ; mix with agitation," D. "Oil of peppermint, fʒiij. ; proof spirit, cong. j. ; dissolve," L. "Fresh peppermint, ℔iss. ; proceed as for spirit of caraway," E.) Stimulant and carminative ; Dose, min. xx. to fʒj.

MENTHA PULEGIUM, D. PULEGIUM, L. E.—*Pennyroyal. Herb (fresh and dried flowering herb,* L.*) of Mentha pulegium.* Indigenous ; belonging to the Natural family *Labiatæ (Lamiaceæ,* Lindley,) and to the Linnæan class and order *Didynamia Gymnospermia.*

BOTANICAL CHARACTERS.—This mint is distinguished by its prostrate stems, and small, frequently recurved leaves ; both of which are thickly covered with short hairs.

PROPERTIES.—Pennyroyal has a strong, peculiar, aromatic odour, and a pungent, somewhat bitter, cooling taste ; it contains a volatile oil on which its properties depend, and which is obtained by the usual process of distillation ; it is of a pale greenish-yellow colour, with the odour and taste of the plant; its density is 0·925; and its composition $C^{10}H^{8}O$.

THERAPEUTICAL EFFECTS.—Pennyroyal is identical in action with peppermint, but as its odour and taste are not so agreeable, it is much less used.

DOSE AND MODE OF ADMINISTRATION.—*Oleum Pulegii*, D. L. E. *Spiritus Pulegii*, L. *Aqua Pulegii*, D. L. E.: are all prepared with pennyroyal in the same manner as the corresponding preparations of peppermint. The doses also are the same.

Essentia Menthæ Pulegii, D. (Take of oil of pennyroyal, f℥j.; rectified spirit, f℥ix.: mix with agitation.) Dose, min. xx. to fʒj.

MENTHA VIRIDIS, D. L. E.—*Spearmint. Herb (Fresh and dried flowering herb,* L.) *of Mentha viridis.* Indigenous; belonging to the Natural family *Labiatæ (Lamiaceæ,* Lindley,) and to the Linnæan class and order *Didynamia Gymnospermia.*

BOTANICAL CHARACTERS.—Leaves, lanceolate, acute, glabrous, sessile; Spikes, interrupted, cylindrical, loose; Bracteas setaceous, somewhat hairy as well as the calyx.

PROPERTIES.—Spearmint has a strong, peculiar, to many persons disagreeable, odour, and a warm, bitter taste followed by a sense of coldness when air is drawn into the mouth; these properties are very much lost by drying. They depend on a volatile oil, of which the fresh herb contains only a 500th part. This oil is of a light-yellow colour, acquiring a reddish-brown tint by age; it possesses intensely the odour and taste of the plant. Its density is 0·914; and its composition $C^{35}H^{28}O$ (Kane.)

THERAPEUTICAL EFFECTS.—Spearmint resembles in its action peppermint; by some it has been said to repel the secretion of milk, and to act as an emmenagogue. As it is neither as powerful nor as agreeable as peppermint it is not so much used.

DOSE AND MODE OF ADMINISTRATION.—*Oleum Menthæ viridis*, D. L. E. *Essentia Menthæ viridis*, D. *Spiritus Menthæ viridis*, L. E. *Aqua Menthæ viridis*, D. L. E.: are all prepared with spearmint, in the same manner as the corresponding preparations of peppermint. The doses also are the same.

Infusum Menthæ, D. (Take of spearmint, dried, and cut small, ʒiij.; boiling water, Oss.; infuse for fifteen minutes, in a covered vessel, and strain. The product should measure about eight ounces.) Used as a vehicle for other remedies in irritable states of the stomach. Dose, f℥j. to f℥ij.

MYRISTICA, L. E. MYRISTICA MOSCHATA, D.—*Kernel of the fruit of Myristica moschata,* D., *of Myristica officinalis,* L. E. *Nutmegs.*

MYRISTICÆ OLEUM, L. MYRISTICÆ ADEPS, E. *Concrete expressed oil from the kernel of the fruit of Myristica officinalis.*

MYRISTICÆ OLEUM, E.—*Volatile oil from the kernel of the fruit of Myristica officinalis.*

This tree (*Myristica fragrans*, Houtt) is a native of the Molucca Islands; belonging to the Natural family *Myristicaceæ,* and to the Linnæan class and order *Diœcia Monadelphia.*

BOTANICAL CHARACTERS.—A tree, 20–30 feet high; Leaves, aromatic, oblong, acuminate, smooth, simple-nerved; Flowers pale yellow, in axillary racemes; Fruit, pyriform, about the size of a peach, smooth, dehiscing by two nearly equal longitudinal valves, and exposing the fleshy, scarlet arillus *(mace,)* closely embracing the shell, within which is contained the kernel *(the nutmeg.)*

PRPOERTIES.—Nutmegs are too well known to require description; they are imported from the Moluccas. They have a peculiar, fragrant, powerful odour, and a warm, aromatic taste. Nutmegs consist of 31·6 per cent of fat butyraceous fixed oil, 6 of volatile oil, 2·4 of starch, 1·2 of gum, 0·8 of acid, and 54 of lignin (Bonastre.) The volatile oil, *Oleum Myristicæ,* D. E., which is obtained by distillation, is usually imported, but the Dublin College directs it to be prepared by the general process for obtaining volatile oils. It is colourless or slightly yellow, of a rather viscid consistence, and has the odour and taste of nutmegs. Its density is 0·948. The fixed oil, *Myristicæ oleum,* L., *Myristicæ adeps,* E., *Oil of mace,* is procured by exposing bruised nutmegs to the vapour of boiling water, and pressing between heated plates of iron. It is imported in large rectangular cakes covered with the leaves of some monocotyledonous plant; is a soft solid, of a reddish yellow colour, with the odour and taste of nutmegs. It consists of an aromatic volatile oil, mixed with three fats; two of which are readily dissolved by alcohol: the third which is thus separated has been named *myristicine.* Mace is composed of a volatile oil, a red fat oil soluble in alcohol, a yellow fat oil insoluble in alcohol, alcoholic extractive, amidin, lignin, &c. Nutmegs and mace impart both odour and taste to boiling water; but they yield their active properties more completely to alcohol.

ADULTERATIONS.—Nutmegs from which the volatile oil has been obtained, are sometimes mixed with good nutmegs, the holes which are bored in them being stopped up with powdered sassafras. This fraud is seldom attempted in the present day; it may be detected by the lightness of the nutmeg. Those nutmegs which are round, plump, heavy, and not worm eaten, should be chosen.

THERAPEUTICAL EFFECTS.—Nutmegs are agreeable aromatic stimulants, chiefly used as flavouring ingredients. Taken in large quantity they prove narcotic, and consequently their use should be avoided by those of an apoplectic or paralytic tendency. The fixed oil has been employed externally as a stimulant in chronic rheumatism and paralysis.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. x. to gr. xxx.

Oleum Myristicæ, D. E. Min j. to min. v. dropped on sugar.

Essentia Myristicæ moschatæ, D. *Spiritus Myristicæ,* L. E. ("Take of oil of nutmeg, f℥j. ; stronger spirit, f℥ix. ; mix with agitation," D. "Nutmegs, bruised, ℥iiss. ; proof spirit, cong. j. ; water, Oj. ; mix and [with a slow fire, L.] distil a gallon," L. E.) Stimulant and aromatic, an excellent addition to cathartic mixtures to prevent griping. The dose of the essence of the Dublin Pharmacopœia is min. xx. to fʒj. ; that of the spirit of the other Colleges is from fʒj. to fʒiv.

Oleum Myristicæ, L. *Myristicæ adeps,* E. Used only in the preparation of the *Emplastrum Picis,* L. E.

ORIGANUM, E.—*Herb of Origanum vulgare.* This, the common marjoram, is an indigenous plant belonging to the Natural family *Labiatæ (Lamiaceæ,* Lindley,) and to the Linnæan class and order *Didynamia Gymnospermia.*

PROPERTIES.—It has a peculiar aromatic odour, and a warm pungent taste ; these properties depend chiefly on volatile oil. This, commonly called, *Oil of Marjoram, Oil of Thyme,* may be obtained from the flowering herb by the usual process of distillation. It is of a reddish colour, becoming darker by age, and has the odour and taste of the plant. Its density is 0·867 ; and its composition $C^{50}H^{40}O$. A hundred weight of the plant yields on an average from 8 to 10 ounces of oil.

THERAPEUTICAL EFFECTS.—Marjoram possesses the aromatic stimulant properties of the Labiate plants generally, but in the present day it is seldom used in medicine. The oil, which is now omitted from all the British Pharmacopœias, may be given in doses of from min. j. to min. iij. on sugar. It is sometimes employed to relieve tooth-ache, dropped on cotton and placed in the hollow of a carious tooth. Dissolved in olive oil, it is used occasionally as a stimulating embrocation.

PIMENTA, D. L. E.—*Pimento. Allspice. Jamaica pepper. Unripe berries of Eugenia pimenta.* A native of the West Indies; belonging to the Natural family *Myrtaceæ,* and to the Linnæan class and order *Icosandria Monogynia.*

BOTANICAL CHARACTERS.—A handsome tree, about 30 feet high ; Leaves, oblong, pellucid-dotted, about 4 inches long ; Flowers, numerous, greenish-yellow, in terminal bunches or panicles ; Berry, succulent, dark-purple when ripe, 2-seeded.

PROPERTIES.—Pimento is in the form of round blackish berries, rough, umbilicated with the persistent teeth of the calyx. The odour resembles a mixture of cloves, cinnamon, and nutmegs, whence the name *allspice ;* the taste is pungent and aromatic, like that of cloves. These properties depend principally on volatile oil, of which Bonastre obtained 10 per cent. from the husk and only 5 per cent. from the kernel. This oil, *Oleum Pimentæ,* D. L. E., an article of the Materia Medica in the London Pharmacopœia, is obtained from the berries by the usual process of distillation; it is of a yellowish colour when first drawn, but soon acquires a reddish tint; it has the peculiar odour of allspice, and a burning aromatic taste. Oil of allspice of commerce is heavier than water, its density being about 1·020. It is a mixture of a heavy and light oil, which may be obtained separately by distillation with solution of potash, as the heavy oil forms crystalline compounds with the alkalies. Pimento communicates both odour and taste to boiling water, but it yields its properties more completely to alcohol.

THERAPEUTICAL EFFECTS.—Pimento is an aromatic stimulant, not much employed in medicine. Its preparations are chiefly used to communicate warmth and flavour to other substances.

DOSE AND MODE OF ADMINISTRATION.—In substance from ʒss. to ʒj.

Oleum Pimentæ, D. L. E. Dose, min. ij. to min v.

Essentia Pimentæ, D. (Take of oil of pimento, f℥j.; rectified spirit, f℥ix.; mix with agitation.) Dose, min. xxx. to fʒj.

Spiritus Pimentæ, L. E. ("Oil of pimento, fʒij.; proof spirit, cong. j.; dissolve," L. "Pimento, bruised, ℔ss.; proceed as for spirit of caraway," E.) Dose, fʒj. to fʒij.

Aqua Pimentæ, D. L. E. ("Take of essence of pimento, f℥j.; distilled water, cong. ss.; mix with agitation, and filter through paper," D. "Pimento, bruised, ℔j.; water, cong. ij.; distil a gallon. May be more quickly prepared with the oil of pimento as directed for *Aqua Anethi,*" L. "Pimento, bruised, ℔j.; water, cong. ij.; rectified spirit, f℥iij.; mix, and distil off one gallon," E.) Carminative and stimulant, used in the flatulent colic of children, and as a vehicle for other medicines. Dose, f℥j. to f℥ij.

INCOMPATIBLES.—The sesqui-salts of iron.

PIPER LONGUM, L. E.—*Long pepper. Dried spikes (Unripe fruit,* L.) *of Piper longum.* A native of India, belonging to the Natural family *Piperaceæ,* and to the Linnæan class and order *Diandria Trigynia.*

BOTANICAL CHARACTERS.—A small, shrubby climber; Leaves, alternate, petiolate, ovato-cordate; Flowers, small; closely set on the axillary spadices.

PROPERTIES.—Long pepper consists of the spadices which are gathered before they are fully ripe, and dried in the sun. As met with in commerce, they are of a grayish colour, hard, about an inch and a-half in length, cylindrical, striated diagonally on their surface. They have a somewhat aromatic odour, and a very pungent spicy taste. The composition of long pepper is almost identical with that of black pepper, (see next article).

THERAPEUTICAL PROPERTIES.—This pepper is somewhat more acrid than *piper nigrum,* but it may be employed in the same cases. Dose, gr. v. to ℈j.

PIPER NIGRUM, D. L. E.—*Black pepper. Dried unripe berries of Piper nigrum.* A native of the continent of India, cultivated in the East and West Indian Islands; it belongs to the Natural family *Piperaceæ,* and to the Linnæan class and order *Diandria Trigynia.*

BOTANICAL CHARACTERS.—Stem, shrubby, climbing, 8–12 feet long, jointed, dichotomous; Leaves, elliptical, acuminate, 5–7 nerved; Flowers, whitish, small, covering thickly a cylindrical, pendulous spadix; Fruit, distinct, at first green, changing as it ripens to bright red, and finally to black.

PREPARATION.—Before the berries on each spike have all changed to red, they are collected and dried in the sun, to constitute *black* pepper. *White* pepper is procured by soaking the fully ripe seeds in water, so as to enable the outer husks to be afterwards removed by rubbing.

PHYSICAL PROPERTIES.—Black pepper is in the form of small spherical bodies, blackish and rough externally, whitish within, consisting of the outer wrinkled tegument, surrounding the hard smooth seed. It has a strong, peculiar aromatic odour, and a very pungent acrid taste. White pepper is the white nucleus, the outer black tegument having been removed.

CHEMICAL PROPERTIES.—Black pepper is composed of a neutral crystalline principle, which has been named *Piperin,* of a very acrid soft resin, balsamic volatile oil, extractive, gum, bassorin, starch, malic and tartaric acids, &c. The active principles are the *piperin,* resin, and volatile oil. Piperin may be readily prepared by Poutet's process as follows:—"Prepare an alcoholic extract of black pepper, digest in a solution of caustic potash, and agitate with water; filter and wash carefully with water what remains on the filter; dissolve it in warm alcohol, and crystallize by cooling." As usually met with, piperin is a dark yellow, resinous-looking substance, but it may be obtained in transparent, colourless, four-sided prisms; it is tasteless and inodorous, insoluble in cold water, dissolves sparingly in boiling water or cold alcohol, but is very soluble in boiling alcohol; it melts at 212°. It is a neutral principle; its composition, according to Wertheim and Rochleder, is $C^{70}H^{37}O^{10}N^{2}+2HO$. Black pepper imparts its properties partially to water, but more completely to alcohol.

THERAPEUTICAL EFFECTS.—Pepper is an acrid aromatic stimulant, in general use as a spice. It also possesses remarkable febrifuge properties, which reside in the piperin. This substance has been employed with much success in the treatment of ague, and has succeeded in many instances in effecting a cure in cases where quina and other remedies have failed. An interesting account of the employment of piperin in the treatment of intermittent fevers in the Island of Trinidad, by Dr. Hartle, has been published in the 55th volume of the Edinburgh Medical Journal. As a stimulant, black pepper will be found a useful addition to bitters in atony of the digestive organs; externally it has been used in the form of ointment to chronic diseases of the scalp, and as an adjunct to rubefacient cataplasms.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. v. to gr. xx.

Piperin is given in doses of gr. iij. to gr. v. every hour until gr. xviij. have been taken. It may be made into pill with mucilage or conserve of roses.

Confectio Piperis nigri, D. E. *Confectio Piperis*, L. (" Take of black pepper, in fine powder; liquorice root, in powder, of each, ℥ss. ; refined sugar, ℥j. ; oil of fennel, fʒss. ; clarified honey, *by weight*, ℥ij. Rub the dry substances together into a very fine powder, then add the honey and oil, and beat them into a uniform mass," D. " Black pepper ; and elecampane root, of each, ℔j. ; fennel seeds, ℔iij. ; honey ; and white sugar, of each, ℔ij. ; rub the dry ingredients together to a very fine powder ; keep in a covered vessel ; and whenever the confection is to be used, the honey being gradually added, pound them until they are thoroughly incorporated," L. " Black pepper ; and liquorice root of each, ℔j.; fennel, ℔iij. ; honey ; and white sugar, of each, ℔ij. ; triturate the solids together into a very fine powder, and beat the whole into a uniform mass," E.) This preparation was introduced into the pharmacopœias as a substitute for a quack medicine called *Ward's paste for piles*. It will be found useful in hemorrhoids occurring in the weak and debilitated. Dose, ʒj. to ʒij. ; to derive any benefit from its use it must be preserved in for two or three months.

Rubefacient Cataplasm, PARIS CODEX. (Barley meal, ℥iv. ; vinegar, ℥j. ; whites of three eggs ; water, sufficient to make a cataplasm of a proper consistence ; spread on linen, and sprinkle over it half an ounce each of black pepper and of fennel in fine powder.) A speedy rubefacient.

INCOMPATIBLES.—Astringent vegetable preparations.

POTASSII SULPHURETUM, L. E. HEPAR SULPHURIS, D.—*Sulphuret of Potassium. Liver of Sulphur.*

PREPARATION.—An article of the Materia Medica in the London Pharmacopœia.— " Take of sublimed sulphur, ℥iv. ; carbonate of potash from pearl-ash, first dried, and then reduced to powder, ℥vij. Mix these ingredients in a warm mortar, and having introduced them into a Hessian crucible, let this be heated, first gradually, until effervescence has ceased, and finally to low redness, so as to produce perfect fusion, and let its liquid contents be then poured into an iron cup, over which a second vessel should be immediately inverted, so as to exclude the air as completely as possible, while solidification is taking place. The solid product thus obtained should, when cold, be broken into fragments, and immediately enclosed in a green-glass bottle, furnished with an air-tight stopper," D. " Sulphur, ℥j. ; carbonate of potash, ℥iv. ; triturate them well together ; and heat them in a covered crucible till they form a uniform fused mass, which when cold is to be broken to pieces and kept in well-closed bottles," E.

PHYSICAL PROPERTIES.—This preparation occurs in various sized pieces of a yellowish-green colour, hard and fragile ; inodorous when quite free from moisture, but emitting the disagreeable odour of sulphuretted hydrogen when moistened. It has an acrid, bitter, alkaline taste.

CHEMICAL PROPERTIES.—It is a mixture of 2 equivalents of tersulphuret of potassium, and 1 of sulphate of potash ($2\,KS^3 + KO, SO^3$), BERZELIUS. By exposure to the air it deliquesces, attracts oxygen, and is all converted into sulphate of potash, becoming white and inodorous. Hepar sulphuris is readily soluble in water; the solution is of a yellow colour, and highly alkaline.

ADULTERATIONS.—Liver of sulphur is seldom met with in a pure state in the shops, in consequence of its undergoing decomposition so readily.

THERAPEUTICAL EFFECTS.—In large doses, sulphuret of potassium acts as a powerful narcotico-acrid poison, a few drachms producing death with convulsions and tetanic spasms. In small doses, it operates as a general stimulant, and as such, is employed on the continent in the advanced stages of hooping cough, in chronic rheumatism, in rebellious skin diseases, &c.; but in this country it is rarely used as an internal remedy. As a topical agent it is applied dissolved in water in the form of lotion or bath, or made into an ointment with axunge, in chronic cutaneous diseases principally those of a scaly character, and has been also used in the obstinate eruptions which affect the scalp.

DOSE AND MODE OF ADMINISTRATION.—For internal use, gr. iij. to gr. x. dissolved in some aromatic water and sweetened with syrup.

Balneum Sulphuratum, RAYER. (Sulphuret of potassium, ℥iv.; tepid water, cong. xxx.; dissolve in wooden vessels.) This may be employed as a local or general bath in skin diseases.

Unguentum Potassii Sulphureti, DEVERGIE. (Solution of sulphuret of potash, 12 parts; carbonate of potash, 8 parts; axunge, 30 parts; mix.) For scabies and other cutaneous diseases.

INCOMPATIBLES.—The acids; and most metallic solutions.

In all cases of poisoning with this substance, the best antidotes are solutions of chlorinated lime or chlorinated soda, with emollient drinks.

ROSMARINUS, D. E. ROSMARINI OLEUM, *(Anglicanum)*, L.—*Rosemary. The tops of Rosmarinus officinalis*, D. E. *Oil distilled from the flowering tops of Rosmarinus officinalis*, L. A native of the south of Europe; belonging to the Natural family *Labiatæ (Lamiaceæ*, Lindley,) and to the Linnæan class and order *Diandria Monogynia.*

BOTANICAL CHARACTERS.—A shrub, 6–8 feet high; Leaves, evergreen, sessile, lanceolate, revolute at the edge, glabrous on the upper surface, tomentose beneath; Flowers, pale-blue, in small spikes at the extremities of the young branches.

PROPERTIES.—The dried tops have an aromatic agreeable odour, somewhat resembling peppermint, and a warm, pungent, bitter taste.

These properties depend chiefly on volatile oil, of which a pound of the fresh plant yields about one drachm. This oil, *Oleum Rosmarini*, D. L. E., is obtained by the usual process of distillation; it is limpid and colourless, with the odour and taste of the herb in an intense degree. Its density is 0·897; and its composition $C^{45} H^{38} O^{2}$, (Kane). Rosemary tops communicate their odour to boiling water, but more completely to spirit.

ADULTERATIONS.—Oil of rosemary is often adulterated with oil of turpentine; the fraud may be detected by the odour when dropped on a heated spatula, or by its not being completely soluble in alcohol.

THERAPEUTICAL EFFECTS.—Rosemary possesses the aromatic stimulant properties of the Labiate plants before described, and may be used for the same purposes. The oil is frequently added to stimulating liniments, principally on account of its odour.

DOSE AND MODE OF ADMINISTRATION.—Of the oil, min. ij. to min. v. dropped on sugar.

Essentia Rosmarini, D. (Take of oil of rosemary, f℥j.; rectified spirit, f℥ix.; mix with agitation.) Dose, min. x. to min. xx.

Spiritus Rosmarini, L. E. ("Oil of rosemary, ʒij.; rectified spirit, cong. j.; dissolve," L. "Rosemary, ℔iiss.; proceed as for spirit of lavender," E.) Seldom used internally. Dose, min. x. to min. xxx.

SABADILLA.—*Cevadilla* (described in the division *Anthelmintics*), is a powerful stimulant, and as such is used in the form of tincture as an external application in chronic rheumatism and paralysis, and over the region of the heart in hysterical and nervous palpitations. The powder of the seeds is employed to destroy pediculi, but its application is not unattended with danger, especially if the skin be broken. The active principal of cevadilla is *veratria*, as before mentioned, and it was principally as a means of affording that alkaloid, it was originally introduced into the London and Edinburgh Pharmacopœias; it has however been omitted from the last edition of the London Pharmacopœia, in which Veratria is an article of the Materia Medica, being designated;—*An alkali prepared from the seeds of Asagræa.* The following is the process directed to be followed by the Edinburgh College:—

VERATRIA.—Take any convenient quantity of cevadilla; pour boiling water over it in a covered vessel, and let it macerate for 24 hours; remove the cevadilla, squeeze and dry it thoroughly with a gentle heat. Beat it now in a mortar, and separate the seeds from the capsules by brisk agitation in a deep narrow vessel. Grind the seeds in a coffee mill, and form them into a thick paste with rectified spirit. Pack this firmly in a percolator, and pass rectified spirit through it till the spirit ceases to be coloured. concentrate the spirituous solutions by distillation so long as no deposit forms; and pour the residuum, while hot, into 12 times its volume of cold water. Filter through calico, and wash the residuum on the filter so long as the washings precipitate with ammonia. Collect this precipitate on a filter, wash it slightly with cold water, and dry it first by imbibition with filtering paper, and then in the vapour-bath. A small additional quantity may be got by concentrating the filtered ammoniacal fluid, and allowing it to cool.—Veratria thus obtained is not pure, but sufficiently so for medical use. From this coloured substance it may be obtained white, but at considerable loss, by solution in very weak muriatic acid, decolorization with animal charcoal, and precipitation with ammonia.

PHYSICAL PROPERTIES.—Veratria is an uncrystallizable solid, pulverulent, as met with in commerce of a grayish-white colour, but it may be obtained perfectly white. It has an intensely acrid taste, and is said to be inodorous, but the smallest quantity applied to the lining membrane of the nostrils provokes violent sneezing.

CHEMICAL PROPERTIES.—It is composed of $C^{64} H^{52} N^{2} O^{16}$ (Merck); is not volatile nor altered by exposure to the air ; fuses at 230°, and cools into a transparent yellowish mass. It reacts alkaline, is nearly insoluble in cold water, requires 1000 parts of boiling water for its solution, is sparingly soluble in ether, but very soluble in alcohol. It forms salts with the acids, of which the hydrochlorate and the sulphate are alone crystallizable.

ADULTERATIONS.—Veratria very commonly contains lime; the adulteration may be readily detected by heating a small quantity in a platinum spoon, when, if it is pure, it will be completely dissipated.

THERAPEUTICAL EFFECTS.—In large doses, veratria operates as a powerful irritant poison, causing inflammation of the stomach and intestines when swallowed, and if applied to the surface of the body producing much irritation. Its action in small or medicinal doses does not appear to be well understood, but it would seem to be a general stimulant, increased action of the intestines, the kidneys, and the capillaries of the skin being in general produced by its administration. Its use in medicine was until lately confined to neuralgic diseases, for the treatment of which it was first introduced as an external application by Dr. Turnbull ; but the experience of numerous physicians who have tried it on his recommendation, not coinciding with his extravagant praises of the remedy, it has fallen into disrepute. More recently it has been employed in France as an internal remedy in some inflammatory diseases, particularly pneumonia and acute rheumatism, for the former of which it was first proposed by M. Aran, and for the latter, in which its efficacy appears now to be well established on the testimony of many French physicians, by M. Piédagnel. Applied in the form of ointment, veratria has been lately highly recommended in the treatment of scrofulous diseases of the joints by Dr. Klinguer of Glasgow. The action of cevadilla as a stimulant is similar to that of veratria, but of course much weaker.

DOSE AND MODE OF ADMINISTRATION.—Of cevadilla in powder, gr. j. to gr. v.

Tinctura Sabadillæ, (Cevadilla seeds, freed from their capsules according to the directions of the *Edinburgh Pharmacopœia* for preparing *veratria,* and bruised, any quantity ; rectified spirit as much as will cover them; macerate for ten days, express, and filter.) For external use as an embrocation.

Extractum Sabadillæ. (Evaporate the tincture with a gentle heat to a proper consistence.) Dose, gr. ⅛th to gr. ¼th gradually increased. This extract may be advantageously substituted for *veratria.*

Veratria, L. E. Dose, gr. 1-12th increased very cautiously. M. Piédagnel administers it in acute rheumatism in the form of pill, each pill containing 1-14th of a grain of the alkaloid. He prescribes at first three of these pills in the 24 hours, and increases the dose by one pill daily, until ten pills are arrived at, which quantity he does not exceed; but if pain in the throat or stomach, vomiting or diarrhœa be caused sooner, he suspends its use at once, and again resumes it as soon as these symptoms disappear should there be occasion. For an embrocation, ʒj. of the alkaloid may be dissolved in f℥j. of rectified spirit.

Unguentum Veratriæ, TURNBULL. (Veratria, ʒss.; olive oil, ʒj.; prepared lard. ℥j.; mix.)

Tinctura Veratriæ, MAGENDIE. (Veratria, gr. iv.; rectified spirit, f℥j.; dissolve.) Dose, min. x. to min. xv.

In poisoning with veratria, the treatment is the same as in poisoning with Colchicum. (See page 110.)

SERPENTARIA, D. L. E.—*Virginian snake-root. Root of Aristolochia serpentaria.* A native of North America; belonging to the Natural family *Aristolochiaceæ,* and to the Linnæan class and order *Gynandria Hexandria.*

BOTANICAL CHARACTERS.—Stem, simple, flexuous, 8–10 inches high; Leaves, alternate, cordiform, acuminate, slightly pubescent; Flowers, solitary, reddish-brown.

PHYSICAL PROPERTIES.—As imported, serpentaria root consists of a tufted head with numerous attached radicles of a yellowish-brown colour externally, whitish within, with a short resinous fracture. The odour is aromatic, like that of valerian, and the taste warm and camphoraceous.

CHEMICAL PROPERTIES.—It consists of volatile oil, soft resin, bitter extractive, gum, albumen, starch, and some salts. It yields its properties to water and to alcohol.

THERAPEUTICAL EFFECTS.—Virginian snake-root, although at one time in great repute, is seldom employed in the present day. It appears to act as a general stimulant, and as such was used in typhoid fevers, in intermittents, in gangrenous affections, in amenorrhœa of the debilitated, etc. It is still very generally used in America.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form, gr. x. to ʒss.

Infusum Serpentariæ, L. E. ("Serpentaria, ℥ss.; boiling distilled water, Oj.; macerate for four hours in a covered vessel, and strain," L. "Serpentaria, ℥ss.; boiling water, Oj.; infuse for four hours in a covered vessel, and strain," E.) Dose, f℥j. to f℥ij.

Tinctura Serpentariæ, L. E. ("Serpentaria, bruised, ℥iiiss.;

proof spirit, Oij.; macerate for seven days, express and filter," L "Serpentaria, in moderately fine powder, ℥iiiss.; cochineal, bruised, ʒj.; proof spirit, Oij.; proceed by percolation or digestion as for tincture of cinchona," E.) Dose, fʒj. to f℥ij.

INCOMPATIBLES.—Acetate of lead, and nitrate of silver.

SINAPIS ALBA, SEMINA.—*White mustard seed* (described in the division *Emetics*,) was at one time much employed as a stimulant in atonic forms of dyspepsia, but is very rarely used as such in the present day. It was taken whole in the dose of a dessert-spoonful three or four times a-day.

SODÆ CHLORINATÆ LIQUOR, D. L.—*Solution of Chloride of Soda. Chlorinated Soda. Hypochlorite of Soda. Disinfecting liquor.*

PREPARATION.—"Take of chlorinated lime, ℔ss.; water, cong. ss.; crystallized carbonate of soda of commerce, ℥vij. Blend well by trituration in a mortar the chlorinated lime with three pints of the water, and having transferred the mixture to a stoppered bottle, let this be well shaken several times for the space of three hours. Pour out the contents of the bottle on a calico cloth, and to the filtered solution add the carbonate of soda dissolved in the remaining pint of water. Having stirred the mixture well for ten minutes, separate the liquid by a second filtration, and preserve it in a well-stopped bottle. The specific gravity of this liquid is 1034," D. "Carbonate of soda, ℔j.; distilled water, f℥xlviij.; chloride of sodium, ℥iv.; binoxide of manganese, ℥iij.; sulphuric acid, f℥iiss.; dissolve the carbonate in Oij. of water; then put the chloride and binoxide, rubbed to powder, into a retort; and add to them the sulphuric acid, previously mixed with f℥iij. of water and cooled. Apply heat to the mixture, and pass the chlorine first through f℥v. of water, and afterwards into the solution of carbonate of soda above directed," L.

PHYSICAL PROPERTIES.—This solution is of a yellow colour, with a strong odour of chlorine, and a sharp astringent taste.

CHEMICAL PROPERTIES.—Its precise composition has not been ascertained, but it is generally supposed to be a mixture of hypochlorite of soda, bicarbonate of soda, and chloride of sodium. Exposed to the air, chlorine escapes, and crystals of the carbonate of soda are gradually deposited. By evaporation with a gentle heat, crystals are obtained, which by solution in water afford a liquid with the same properties. It bleaches vegetable colours, first acting as an alkali on them. This solution may be distinguished from solution of chlorinated lime by its not precipitating with the oxalates or carbonates.

THERAPEUTICAL EFFECTS.—This solution agrees precisely in its properties with hypochlorite of lime, and is employed for the same purposes (see page 377). For destroying noxious effluvia it is to be preferred to that substance as the salt, *chloride of sodium*, which is left, does not deliquesce; while chloride of calcium is very deliquescent

The Dose for internal use is min. xx. to min. xxx. in a sufficiency of water, which may be sweetened with syrup.

Cataplasma Sodæ Chlorinatæ, L. (Boiling water, f℥vj.; linseed meal, ℥ivss.; solution of chlorinated soda, f℥ij.; add the linseed gradually to the water, stirring constantly; then mix in the chlorinated soda.) An application to foul and gangrenous sores.

SODII CHLORIDUM, D. L. SODÆ MURIAS, E.—*Common salt. Chloride of Sodium (in crystals, L.). Muriate of Soda. Impure commercial Chloride of Sodium, E.*

PREPARATION.—Chloride of sodium is an article of the Materia Medica in the three British Pharmacopœias. On the large scale it is procured by dissolving and crystallizing rock-salt, or by evaporating sea water, or the water of some mineral springs, in which it is contained in large quantities. The Edinburgh College has given a formula for purifying commercial salt:—*Sodæ murias purum,* E. "Take any convenient quantity of muriate of soda, dissolve it in boiling water; filter the solution and boil it down over the fire, skimming off the crystals which form, wash the crystals quickly with cold water, and dry them.

PHYSICAL PROPERTIES.—Chloride of sodium crystallizes in transparent colourless cubes; it has an agreeable saline-taste, but no odour. Its density is 2·17.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of sodium, and 1 of chlorine, (Na Cl). It contains no water of crystallization, but when heated decrepitates, owing to some water being mechanically lodged between the tables of the crystals. Exposed to a bright red heat it fuses, and at a white heat volatilizes unchanged. Chloride of sodium is permanent in the air when quite pure; and is equally soluble in cold and boiling water, requiring 2·7 parts of water for its solution. It is insoluble in absolute alcohol, but rectified spirit dissolves it slightly. It is neutral to test paper.

ADULTERATIONS.—As met with in this country, common salt does not contain any impurity which can interfere with its use for general or pharmaceutical purposes. Owing to the presence of chloride of magnesium, it is frequently slightly deliquescent. The tests for its purity, as given by the Edinburgh College, are as follows:—"A solution is not precipitated by solution of carbonate of ammonia followed by solution of phosphate of soda. A solution of gr. ix. in distilled water is not entirely precipitated by a solution of gr. xxvj. of nitrate of silver."

THERAPEUTICAL EFFECTS.—Chloride of sodium taken internally in moderate quantities acts as a mild stimulant to the digestive organs, promoting the assimilation of the food; on which account, as well as in consequence of its agreeable flavour, it is used generally by man in all parts of the world, as an adjunct to nearly every substance employed by him as an article of diet. It proves serviceable to digestion, too, inasmuch as it prevents, to a certain extent, the generation of intestinal worms in the alimentary canal, to which those who use little or no salt with their food are very subject. In somewhat larger doses salt acts as a mild cathartic, forming a principal ingredient in many mineral waters, in which it augments the operation of the other laxative salts. It acts as an emetic in doses of one or two ounces; and in one instance, a pound of it taken at once occasioned death with all the symptoms of irritant poisoning. Applied to the surface of the body, it is a local stimulant, producing the effects of a rubefacient. Chloride of sodium is not much employed in medicine. As an emetic, it may be administered in narcotic poisoning in the absence of other substances; as a cathartic it is not given alone, but is advantageously combined with the other saline cathartics (see page 122); as an anthelmintic, a strong solution has been injected into the rectum to destroy ascarides; as a general stimulant it is used in some forms of dyspepsia, and in scrofulous and other glandular enlargements; and as a topical agent it is added to both hot and cold baths, when they are intended to act as local stimulants. In America a saturated solution of common salt is employed with much success as a lotion in chronic granular ophthalmia. In cholera, and some other diseases in which the saline constituents of the blood are deficient, a solution consisting of ʒij. of the muriate, and ℈ij. of carbonate of soda, dissolved in f℥lx. of water has been injected into the veins, but the results do not appear to have been more successful than those which followed other methods of treatment; nevertheless in the recent outbreaks of the epidemic, it has been again put strongly forward as an infallible remedy.

DOSE AND MODE OF ADMINISTRATION.—As a stimulant, gr. x. to ʒj. As an emetic, ℥j. to ℥ij. dissolved in Oj. of water. For baths, ℔j. to ℔ij. may be added to from cong. iij. to cong. v. of either cold or warm water.

INCOMPATIBLES.—Nitrate of silver.

STAPHISAGRIA, L. E.—*Stavesacre. Seeds of Delphinium staphisagria.* A native of the south of Europe; belonging to the Natural family *Ranunculaceæ,* and to the Linnæan class and order *Polyandria Trigynia.*

BOTANICAL CHARACTERS.—Stem, cylindrical, branching, downy, about 2 feet high; Leaves, alternate, broad, palmated, smooth on the upper, downy on the under surface; Flowers, purple, in lax racemes.

PROPERTIES.—Stavesacre seeds are about the size of a small pea, irregularly triangular, compressed, dark brown; they have a faint unpleasant odour, and a very acrid bitter taste. Their acridity depends upon an uncrystallizable alkaloid, *delphinia,* which constitutes more than 8 per cent. of the seed. Delphinia is a yellowish-white powder, highly acrid, and poisonous, being in many respects somewhat analogous to veratria; its composition is said to be

$C^{27} H^{19} NO^{2}$? The seeds yield their active properties to boiling water, but more completely to alcohol or to vinegar.

THERAPEUTICAL EFFECTS.—Stavesacre is a powerful irritant, at one time used in medicine as an emetic and anthelmintic, but employed at present only for the destruction of pediculi. An ointment prepared by mixing the powdered seeds with four times their weight of lard, or an infusion of the bruised seeds in vinegar may be used for this purpose. Delphinia has been employed by Dr. Turnbull of London in rheumatic and neuralgic affections. The dose of it is from 1-12th to 1-4th of a grain frequently repeated.

In cases of poisoning with stavesacre or its alkaloid the treatment is the same as in poisoning with colchicum, (see page 110.)

SULPHUR, (described in the division *Cathartics*,) in small doses frequently repeated, acts as a stimulant to the cutaneous vessels, and is therefore administered, occasionally with benefit in chronic diseases of the skin, particularly scabies, for which, however, it is more generally employed as an external application. The curative powers of sulphur in this disease appear to be specific, but it has been more recently shown that it acts as a poison to a small insect *(Sarcoptes hominis* of Raspail), which has been discovered to exist in the pustules of itch, and by which it is believed by many that the disease is produced. Whatever may be its *modus operandi*, sulphur is undoubtedly more generally successful in the cure of scabies than any other substance which has been hitherto employed. It is used on the continent, especially in France, with much effect, combined with carbonate of potash, in the proportion of 2 parts of sulphur and 1 of carbonate of potash to 8 parts of lard : when frictions are carefully made over the entire body with this sulphuro-alkaline ointment, the disease may be cured in a few hours. The surface is first well rubbed with soft soap for half an hour in a warm bath, and afterwards with this ointment. Sulphur is also used as an external application in many other cutaneous eruptions, particularly in lepra and psoriasis, in the very chronic stages of which in the form of vapour, *sulphur-vapour-bath,* its use is at times productive of good results. The dose of sulphur as a stimulant is from gr. x. to gr. xxx. ; it may be given in the form of electuary made with treacle or with syrup. For external application either of the following ointments or that above described may be used.

Unguentum Sulphuris, D. L. E. (" Sublimed sulphur, ℔j. ; prepared lard, ℔iv. ; mix them well by trituration," D. " Sulphur, ℔ss. ; lard, ℔j. ; rub together," L. " Sulphur, ℥j. ; axunge, ℥iv. ; mix them well together," E.)

Unguentum Sulphuris compositum, L. (Sulphur, ℥iv.; white hellebore, powdered, ʒx. ; nitrate of potash, powdered, ℈ij. ; soft soap, ℥iv. ; lard, ℔j. ; rub together.) This ointment often proves very irritating.

TEREBINTHINÆ OLEUM.—*Oil of turpentine* (described in the division *Anthelmintics*), administered in small but frequently repeated doses, acts as a general stimulant to the system, and as such has been employed in the low stages of typhus and common continued fevers, in chronic rheumatism, in neuralgia, in hemorrhages from the mucous surfaces dependent on an atonic state of the vessels, to facilitate the passage of biliary calculi, in sciatica, and to prevent the access of the fit in epilepsy. Its local stimulant properties have been already considered (see page 267); made into an ointment with three parts of prepared lard, I have occasionally found it a useful application in some very chronic cases of scaly eruptions on the scalp. Turpentine vapour-baths at a high temperature have been for some time very generally used and highly extolled in the south of France as a remedy in catarrhal and rheumatic affections; they are prepared by burning in a close chamber pine branches, to the vapour arising from which the patient is exposed, somewhat after the manner of the Russian vapour-baths.

The four following substances nearly allied to turpentine, and obtained from the same or nearly related coniferous trees, are employed as topical stimulants in the forms of ointments, plasters, or cerates.

RESINA, D. L. E.—*Resin of Pinus sylvestris*, D. *The residue of turpentine after the oil is distilled*, L. *Residue of the distillation of the turpentines from various species of Pinus and Abies*, E. Rosin or Resin, is met with in two forms, *Yellow resin, (Resina flava)*, and *Brown resin* or *Colophony (Resina nigra seu Colophonium).* The former is obtained when the application of heat is stopped before all the volatile oil is expelled from the pine turpentines; the latter when the process is continued until all the oil is distilled. Resin is a semi-transparent, very brittle solid, varying in colour from pale-yellow to brownish-black. It has a faint turpentine odour, but is quite tasteless; it consists of two resins which have been named *Pinic* and *Sylvic acids;* the composition of both is the same, viz.; $C^{40} H^{30} O^{4}$. In medicine, yellow resin alone is employed; it is used partly as a local stimulant, but principally to communicate a certain degree of consistency or adhesiveness to ointments, plasters, &c.

Unguentum Resinæ, D. *Ceratum Resinæ*, L. *Unguentum Resinosum*, E. ("Take of resin, in coarse powder, ℔ss.; yellow wax, ℥iv.; prepared lard, ℔j. Melt them together with a gentle heat, strain the mixture, while hot, through flannel, and stir constantly until it concretes," D. "Resin; and wax, of each, ℥xv.; olive oil, Oj.; melt the resin and wax together with a slow fire, then add the oil, and press the cerate while hot through a linen cloth," L. "Resin, ℥v.; axunge, ℥viij.; bees'-wax, ℥ij.; melt them together with a gentle heat, and then stir the mixture briskly while it cools and concretes," E.) These ointments, commonly known under the name of *Basilicon ointment*, are employed as stimulating applications to foul and indolent ulcers.

PIX LIQUIDA, D. L. E.—*Tar. Prepared liquid resin of Pinus sylvestris,* D. *A liquid bitumen prepared by heat from the wood of Pinus sylvestris and other species of Pinus,* L. *From various species of Pinus, and of Abies,* E. Tar is prepared in the countries bordering on the Gulf of Bothnia, from various trees of the fir tribe, by a species of *destillatio per descensum.* The old wood and roots are closely packed into the upper part of a pit dug in the earth, in the bottom of which an iron pan is fixed ; the timber is ignited and covered with sods of earth to prevent the escape of the volatile parts ; and the tar gradually exudes and flows into the iron pan, from whence it is conducted by a pipe into barrels, each of which holds 31½ gallons.

Tar is a thick, tenacious, opaque liquid, of a dark brown, almost black colour, with a strong peculiar odour, and a bitter disagreeable taste. It dries so slowly, even when exposed to the air, that it retains its liquid character for an almost indefinite period. It is composed of various resins, modified oil of turpentine, acetic acid, and water ; communicates both odour and taste to water, which dissolves out its oil and acid ; and is soluble in alcohol, ether, and the fixed and volatile oils.

Tar was formerly used in medicine in chronic catarrhal complaints, and in the form of vapour its inhalation was highly recommended by Sir Alexander Crichton in phthisis. In the present day, however, it is only used as a local stimulant in chronic cutaneous diseases.

Aqua Picis liquidæ, (Tar, ℔ij. ; water, cong. j. ; mix, stirring with a stick for quarter of an hour ; as soon as the tar has subsided, strain the liquor, and keep it in well-closed jars.) *Tar-water,* the above formula for which has been omitted from the last edition of the London Pharmacopœia, was first introduced by Bishop Berkeley as a remedy for diseases of the chest and of the kidneys ; the dose was from Oj. to Oij. daily. Its use is completely obsolete in the present day.

Unguentum Picis liquidæ, D. L. E. (" Take of tar, Oss. ; yellow wax, ℥iv. ; melt the wax with a gentle heat, then add the tar, and stir the mixture constantly until it concretes," D. " Tar ; and mutton suet, of each, ℔j. ; melt together, and press through a linen cloth," L. " Tar, ℥v. ; bees' wax, ℥ij. ; melt the wax with a gentle heat, add the tar, and stir the mixture briskly as it concretes on cooling," E.) Tar ointment is often used, but in my experience rarely with benefit, as a stimulant in chronic diseases of the skin.

Oil of Pitch. By distilling tar with water, a mixture of impure oil of turpentine, a *pyrogenous* oil, and some *pyretin* is procured ; this liquid, under the name of *oil of pitch (Huile de Cade* of the French), is very highly spoken of on the continent as a local application in many cutaneous diseases, especially obstinate forms of lichen, herpes, and eczema, but in some cases in which I tried it, the results were not at all satisfactory. Inunctions are made with it twice a-day. Most French pharmacologists restrict the term, *huile de cade (Oleum Cadinum)* to a tarry oil obtained by the dry distillation of the wood of the *Juniperus oxycedrus*.

PIX NIGRA, L. PIX ARIDA, E.—*A dry bitumen prepared from tar*, L. *Pitch from various species of Pinus and Abies*, E. This is a solid black matter left after the oil, the acid, and water are expelled by heat from tar. It is only used externally, the ointment being employed for the same purposes as tar ointment.

Unguentum Picis, L. (Pitch; wax; and resin, of each, ℥xj.; olive oil, Oj.; melt together and press through a linen cloth.)

PIX BURGUNDICA, D. L. E.—*Concrete resinous exudation (probably in a great measure*, E.) *from Abies excelsa*, D. E. *Impure resin prepared from the turpentine of Abies excelsa*, L. *Burgundy Pitch.* This substance as met with in the shops is usually a mixture of common turpentine, resin, and palm oil. It is in soft masses of a pale-yellow colour, with a terebinthinate odour and taste; when pure, according to Guibourt, it has a strong, agreeable, balsamic odour, and a sweet perfumed taste. In the London Pharmacopœia it is directed to be prepared for use in medicine "by a process similar to that for *prepared ammoniacum*," when it constitutes *Pix Burgundica præparata*. It is only used externally as a topical stimulant.

Emplastrum Picis, L. E. ("Burgundy pitch, prepared, ℔ij.; frankincense, prepared, ℔j.; resin; and wax, of each, ℥iv.; expressed oil of nutmegs, ʒj.; olive oil; and water, of each, f℥ij.; add the oils and the water to the frankincense, pitch, resin, and wax melted together. Then evaporate them all, constantly stirring, to a proper consistence," L. "Burgundy pitch, ℔iss.; resin; and bees' wax, of each, ℥ij.; oil of mace, ℥ss.; olive oil, f℥j.; water, f℥j.; liquefy the pitch, resin, and wax with a gentle heat, add the other articles, mix them well together, and boil till the mixture acquires the proper consistence," E.) A stimulating plaster applied to the chest in chronic catarrhal complaints, and over the seat of the pain in local neuralgia and in chronic rheumatism.

THUS, D. L.—*Frankincense. Obtained from Abies excelsa*, D. *A turpentine, hardened in the air, exuding from the bark of Abies excelsa and Pinus palustris*, L. Much confusion exists as to the relation existing between Burgundy pitch and Frankincense; but the former is generally believed to be obtained by melting the latter in water immediately after it has been removed from the tree and straining through a cloth. Frankincense is chiefly imported from Canada in the form of yellowish or brownish-yellow tears which are hard and brittle; it has an agreeable fragrant, terebinthinate odour, stronger when bruised, and an acrid bitter taste. It is used in medicine only as an addition to some plasters, chiefly to give them odour and consistency. Its properties, nevertheless, are similar to those of the other turpentines. The London College directs it to be prepared for use as follows:—*Thus præparatum*, "Frankincense, ℔j.; water, sufficient to cover it; boil the frankincense in the water until it liquefies and strain through a hair sieve;

then, when cold, pour off the water and keep the frankincense for use."

VERATRUM, L. E. *White hellebore. Rhizome of Veratrum album.* A native of the mountainous regions of central and southern Europe; belonging to the Natural family *Melanthaceæ*, and to the Linnæan class and order *Polygamia Monœcia.*

BOTANICAL CHARACTERS.—Rhizome, fleshy, cylindrical, giving origin to numerous undivided radicles; Stem, 1–4 feet high; Leaves, sheathing, plaited, ovato-oblong; Flowers, greenish-yellow, in a large spreading panicle.

PHYSICAL PROPERTIES.—As usually met with in the shops, white hellebore root consists of the rhizome with the radicles attached; it is in pieces of from two to three inches long, about the thickness of the little finger; covered with a rough, dark-brown bark; grayish-white internally. In the fresh state, it has a strong, disagreeable smell, which is nearly lost by drying; but it retains the acrid, intensely bitter taste.

CHEMICAL PROPERTIES.—It is composed of a fatty matter, yellow colouring matter, starch, gum, lignin, and an alkaloid on which its acridity depends, and which has been named *veratria* (see page 407), combined with gallic acid, *(Pelletier and Caventou).* More recently Simon has announced the discovery of two new vegetable alkaloids in white hellebore root, one of which he has called *Jervin*, and the other *Barytin.* The acridity of the root is extracted both by water and by alcohol.

THERAPEUTICAL EFFECTS.—The local action of white hellebore root is powerfully irritant. Snuffed up the nostrils it produces a copious flow of mucus, with much sneezing; wherefore it was once used as an errhine,—a class of medicines now quite obsolete,—two or three grains of the root, finely powdered and mixed with ten or twelve grains of powdered liquorice-root, orris-root, or starch, being employed every evening; it enters into the composition of most cephalic snuffs. White hellebore root, when taken internally, is a powerful stimulant, even in not very large doses causing irritation and inflammation of the stomach. It was at one time much used in nervous affections and in chronic cutaneous diseases, both externally and internally; its employment in gout has been replaced by colchicum: and its application for the destruction of pediculi by stavesacre; so that at present it is scarcely put to any use: the dose of the powder is from gr. ij. to gr. v. cautiously increased.

Vinum Veratri, L. (White hellebore, sliced, ℥viij.; sherry wine, Oij.; macerate for seven days and filter). Dose, min. v. to min. x.

In poisoning with white hellebore, the same treatment should be used as in poisoning with colchicum, (see page 110).

VINUM ALBUM HISPANICUM, D. VINUM XERICUM, L. VINUM ALBUM, E.—*Spanish white wine. Sherry.* It would be quite foreign to the scope of this work to enter into any detailed account of the mode of preparation, or peculiar properties of the almost innumerable varieties of wine that are to be met with. The observations to be made will therefore refer to wines generally.

PROPERTIES.—Wine is a transparent liquid, of a yellowish, reddish-yellow, or deep red colour. It has a peculiar, agreeable odour *(bouquet,)* and taste ; both odour and taste vary exceedingly. Wine consists of water, alcohol, tartaric and acetic acids, bitartrate of potash, tartrate of lime, extractive matter, colouring matter, vegeto-animal matter, and a peculiar volatile oil or rather ether, which has been named œnanthic ether. In the white wines, tannin and colouring matter are less in proportion than in the red wines. The quantity of alcohol which is present in wine varies exceedingly, some of the weaker German wines containing only 6·90 per cent. by weight of alcohol, while strong Port wine contains 17·10 per cent. (Christison).

ADULTERATIONS.—The only adulterations of wine, which are of importance with reference to its use in medicine, are the additions of lead or of lime which are sometimes used for the purpose of correcting acescency. The former is detected by the black precipitate which is produced on the addition of sulphuretted-hydrogen. The latter by the white precipitate formed with solution of oxalate of ammonia.

THERAPEUTICAL EFFECTS.—Wine is an excellent stimulant in the advanced stages of typhus fevers, being generally better suited for this purpose than any other alcoholic liquid. Its use is particularly called for when delirium is present with much sinking of the vital powers, or should the nervous symptoms as singultus, subsultus tendinum, and sleeplessness unaccompanied by any local inflammation or congestion predominate. The use of wine in fever is not contraindicated, as has been stated by many, when the tongue is dry or black, when the eyes are red or suffused, or when there is morbid heat of the surface : as wine often proves of great benefit when one or even more of these symptoms is present. Wine is also given with much advantage in convalescence from acute diseases, in chronic debility especially when it is caused by excessive discharges, in mortification unaccompanied by inflammatory symptoms, in erysipelas and in tetanus. When any local congestion or inflammation is present or may be apprehended, the administration of wine in the treatment of disease is for the most part calculated to do mischief.

Although Sherry is the only wine officinal in the Pharmacopœias, Port is more generally employed in medicine : Claret and Madeira are also used. When its greater strength and its astringency are not objectionable, Port wine, when it can be had pure, now a matter of great difficulty, is always to be preferred. Madeira and Claret are often inadmissible on account of their acidity ; but should this not be a contraindication to their use, the former is well adapted for debilitated or broken-down habits ; the latter when the employment of stronger wines might prove injurious. Sherry is chiefly employed in the preparation of the medicated wines, but Cape wine is usually substituted by druggists on account of its cheapness ; in a dietetical point of view, Sherry is the wine in most general use in the British Islands, and that calculated to agree best with most constitutions.

DOSE AND MODE OF ADMINISTRATION.—The quantity of wine which should be administered in the treatment of disease varies so exceedingly in different cases, that it is quite impossible to lay down any general rule thereon. From f℥viij. to f℥xx. is the quantity usually given in the 24 hours, and it should be borne in mind that there is a great tolerance of wine in disease. As an injection for the radical cure of hydrocele, two parts of Port wine are diluted with one of water.

ZINGIBER, D. L. E.—*Ginger. Rhizome of Zingiber officinale.* Supposed to be originally a native of the East Indies, at present cultivated in most tropical countries. It belongs to the Natural family *Zingiberaceæ,* and to the Linnæan class and order *Monandria Monogynia.*

BOTANICAL CHARACTERS.—Stem, annual, two to three feet high, cylindrical, invested with the smooth sheaths of the leaves ; Leaves, linear-lanceolate, smooth ; Flowers, yellowish with purple lips, in cone-shaped, radical or rarely terminal, solitary spikes ; Fruit, a 3-celled capsule.

PREPARATION.—The rhizome or root-stalk, which is biennial, is dug up at the commencement of the second year of its growth, cleaned, scalded with boiling water, and dried in the sun, when it constitutes what is called black ginger ; to prepare white ginger, the rhizome is not scalded, but the outer coats are removed by scraping.

PHYSICAL PROPERTIES.—As met with in commerce, ginger is in various-sized, flattened pieces, knotty, palmated, hard and compact. *Black ginger* is of a dirty gray colour, and rugose externally, yellowish brown and stringy within. *White ginger* is whitish or pale yellow externally, pale buff within, with a somewhat starchy texture. The finer sorts of ginger are firm, sound and heavy, and have a peculiar, rich, aromatic odour, and a warm, very pungent taste.

CHEMICAL PROPERTIES.—Ginger contains a pale-yellow volatile oil, an acrid soft resin, a sub-resin, gum, starch, extractive, nitrogenous matter, &c. Its properties, which depend chiefly on the volatile oil and soft resin, are extracted by water and by alcohol.

THERAPEUTICAL EFFECTS.—Ginger is a powerful aromatic stimulant ; when taken in moderation increasing remarkably the tone of the digestive organs, and being consequently much employed as a condiment. In medicine it is principally used to give warmth and flavour to other drugs. Ginger acts as a special stimulant to the urino-genital mucous membrane, its use should be therefore avoided by persons who have any tendency to stricture of the urethra. As a local stimulant it is chewed in paralysis of the tongue, relaxation of the uvula, &c.; the powder made into a paste with boiling water and spread on linen is a speedy rubefacient.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. v. to gr. xxx.

Syrupus Zingiberis, D. L. E. ("Take of tincture of ginger, f℥j.; simple syrup, f℥vij.; mix with agitation," D. "Ginger, sliced, ℥iiss.; boiling distilled water, Oj.; sugar, ℔iiss. or a sufficiency; rectified spirit, a sufficiency; macerate the ginger in the water for 4 hours, express and strain, and proceed as for syrup of althæa," L. "Ginger, ℥iiss.; boiling water, Oj.; pure sugar, ℔iiss.; bruise the ginger, infuse it for four hours in the water; and to the strained liquor add the sugar, and dissolve it with the aid of heat," E.) Dose, fʒj. to f℥ss.

Tinctura Zingiberis, D. L. E. ("Ginger, in coarse powder, ℥viij.; rectified spirit, Oij.; macerate for 14 days, strain, express and filter," D. "Ginger, bruised, ℥iiss.; rectified spirit, Oij.; macerate for seven days, express and filter," L. "Ginger, in coarse powder, ℥iiss.; rectified spirit, Oij.; proceed by percolation or digestion as for tincture of cinchona," E.) Dose of the *Dublin* tincture, min. xx. to fʒj., of the *London* and *Edinburgh,* fʒj. to fʒij.

Essence of Ginger commonly kept in shops is nothing more than a very strong tincture.

CHAPTER XIX.

SPECIAL STIMULANTS.

All who look to a merely scientific classification of the Materia Medica object to the use of the terms *Specifics* and *Alteratives*, inasmuch as they are only employed to define agents with the rationale of the remediate modes of action of which we are unacquainted. While this may be fully admitted, the practical utility of such a nomenclature is, nevertheless, so great and so generally understood, that until medical science has arrived at a much more advanced stage of progress than has been as yet attained, it would, I think, be foolish to discard these terms in consequence of any theoretical ideas. I have, therefore, united both in the same chapter under the above title. In this division of medical agents, then, will be included those substances which, by a *special* or peculiar action on individual organs, or on the system generally, produce remediate effects. Those of them which give rise to some alteration, not well understood, in the nature or quality of vital action, are termed *alteratives;* while those which possess a special influence in the treatment of certain diseases are denominated *specifics.* Many alteratives and specifics have been already described in other classes of medicines, but the articles contained in this chapter cannot, with a regard to accuracy or convenience in arrangement, be included in any of them; inasmuch as the nature of the primary influence which some of these agents exert on the animal economy has not been satisfactorily ascertained; and others possess a peculia rinfluence over *certain organs* or *diseases* chiefly :—as examples of the former I may refer to Mercury, Iodine, and Gold; of the latter, to Nux-vomica, Cubebs, and Copaiba.

AMMONIÆ ARSENIAS.—*Arseniate of Ammonia.*

PREPARATION.—This compound is readily prepared by saturating a solution of arsenic acid with ammonia, taking care that the alkali be in excess, evaporating and crystallizing.

PROPERTIES.—Arseniate of ammonia crystallizes in white, transparent, small rhomboidal prisms; its composition being $2\,H^3N\,As^2O^5+HO$. It is a neutral salt, and is soluble in water and in alcohol.

THERAPEUTICAL EFFECTS.—Arseniate of ammonia has not as yet been much employed in this country; but it has been for some time used in France as an internal remedy in the treatment of obstinate cutaneous diseases, particularly those of a scaly character. I have myself employed it very extensively with excellent effect, chiefly in cases where other arsenical preparations have failed to effect a cure, and in languid constitutions. The dose of it is from 1-12th to 1-10th of a grain three times a-day in pill; or the following solution first proposed by Biett may be prescribed:—

Solution of Arseniate of Ammonia. (Arseniate of ammonia, gr. iss.; distilled water, f℥iij.; spirit of angelica, fʒvj.; dissolve.) Dose, fʒj. to fʒiij. in some aromatic water.

ARSENICI IODIDUM.—*Iodide of Arsenic. Teriodide of Arsenic.*

PREPARATION.—"Iodine, ʒij.; arsenic, finely powdered, ʒj.; mix together and maintain in a state of fusion for some time in a digesting flask upon a sand-bath, at as low a temperature as possible; treat the mixture when cool with four ounces of cold alcohol, and pour off the solution from the residual arsenic; then pass into it a stream of arseniuretted hydrogen gas, until its colour is reduced to a wine yellow; and finally, evaporate immediately at a temperature not exceeding 122° F., until it crystallizes." GOPEL.

PROPERTIES.—This is an orange-red powder, odourless and tasteless. Exposed to the air it rapidly undergoes decomposition, iodine escaping and metallic arsenic being left; it is volatilized by heat. Iodide of arsenic is soluble in boiling alcohol, from which, as the alcohol cools, it is deposited in bright crystals. It is decomposed by water into free iodine, hydriodic and arsenious acids. Its composition is $As\,I^3$.

ADULTERATIONS.—As met with in the shops, this preparation frequently contains uncombined metallic arsenic, which may be distinguished by the naked eye.

THERAPEUTICAL EFFECTS.—Iodide of arsenic is employed internally with much benefit in the treatment of chronic cutaneous diseases, particularly in the various forms of psoriasis and chronic eczema especially when occurring in scrofulous habits, and in porrigo; in all of which I have used it extensively and with great success, even in very inveterate cases. Like other preparations of arsenic, its use must be continued for some time after the disease is cured, in order to prevent a relapse. In some cases in which the medicine had been taken daily for five or six weeks, the patients complained of soreness of the eyes, headache, or dryness of the mouth and fauces, which quickly disappeared on omitting the use of the remedy for a few days. It is administered with much benefit in the treatment of cancer, and, in conjunction with the use of an ointment containing iodide of lead as an external application, has produced excellent effects in the hands of many practitioners. On the continent it has been also employed as a topical application in the form of ointment, but its external use is not unattended with danger.

DOSE AND MODE OF ADMINISTRATION.—Iodide of arsenic should be at first given in doses of 1-10th of a grain, which may be cautiously increased to 1-4th of a grain three times a-day. It is best administered in the form of pill made with conserve of roses, or with hard manna.

INCOMPATIBLES.—Acids ; acidulous and metallic salts.

ARSENICI ET HYDRARGYRI HYDRIODATIS LIQUOR, D.—*Solution of Hydriodate of Arsenic and Mercury.*

PREPARATION.—Take of pure arsenic, in fine powder, gr. vj. ; pure mercury, gr. xvj. ; pure iodine, gr. lss. ; alcohol, f℥ss. ; distilled water, f℥ix. or a sufficient quantity ; rub together the arsenic, mercury, iodine, and spirit, until a dry mass is obtained, and, having triturated eight ounces of the water with this in succesive portions, let the whole be transferred to a flask, and heated until it begins to boil. When cooled and filtered, let as much distilled water be added to it as will make the bulk of the solution exactly eight fluid ounces and six drachms.

PROPERTIES.—This solution is of a pale greenish-yellow colour, odourless, with rather a styptic tase. Each f℥j. contains about $\frac{1}{12}$th of a grain of oxide of arsenic, $\frac{1}{4}$th of a grain of oxide of mercury, and $\frac{5}{8}$ths of a grain of iodine in the state of hydriodic acid, in chemical combination.

THERAPEUTICAL EFFECTS.—Donovan's solution, as this compound is ordinarily termed, has been found useful by many practitioners in the treatment of chronic cutaneous diseases, especially those of a scaly character, or in which the scalp is the seat of the disease. It has been also employed with benefit in venereal eruptions, both papular and scaly, in lupus, in impetigo, in pityriasis, &c. Its efficacy in these obstinate affections is supposed to be now so well established, that it has been admitted into the last edition of the Dublin Pharmacopœia. For further information on this subject, I must refer to Mr. Donovan's excellent memoirs in the 16th, 18th, and 22nd vols. of the *Dublin Journal of Medical Science.* In my own practice, however, I must confess that except in cases where the cutaneous disease is complicated with a syphilitic taint, I have found it usually fail in effecting a cure, and in some instances I have seen it produce injurious constitutional effects, when the disease for which it was administered was invariably aggravated. This I have been inclined to attribute to the presence of the mercury in it, and I have therefore latterly substituted for this solution, a compound in which the mercury is replaced by iodide of potassium (see Arsenic, in the chapter on *Tonics.*)

DOSE AND MODE OF ADMINISTRATION.—Min. x. to min. xxx. three times a-day. It should be administered largely diluted with distilled water. The external use of the medicine in the form of lotion (fʒj. to f℥j. of distilled water) has been combined with its internal administration.

INCOMPATIBLES.—Acids; most salts; opium; and the salts of morphia.

AURUM, L.—*Gold.* This metal has been introduced into the last edition of the London Pharmacopœia, being used as a test, but none of its preparations are employed in this country in the practice of medicine. They are, however, frequently administered on the continent, and their virtues highly spoken of. Although it has been stated by many that metallic gold is perfectly inert, a powder of gold *(Pulvis auri)* is officinal in the Parisian Codex. It is prepared in several ways: one of the simplest and best is to rub any quantity of leaf-gold with 7 or 8 times its weight of sulphate of potash in an earthenware or glass mortar, as long as any fragments of the leaves are visible; and then to wash well with warm water, which dissolves out the sulphate of potash, and leaves the gold in the form of a fine powder. Powder of gold is said to be a much more effectual remedy both in primary and secondary syphilis than mercury; it is peculiarly applicable to those cases in which mercury is found to aggravate the disease, or in which the symptoms depend on the excessive use of preparations of that metal; in some instances it produces increased flow of saliva, without affecting the teeth, cheeks, or gums, as that metal does. It has been also used in chronic cutaneous diseases, in scrofulous affections, and in glandular enlargements. Powder of gold may be given internally in doses of gr. ¼ or gr. ½, gradually increased to gr. iij.; it should be made into pill with conserve of roses. It is, however, generally introduced into the system by means of friction on the gums and tongue, or applied on a portion of the skin deprived of the epidermis; it is also used as a local application to chancres in their primary stage. For these purposes, either of the following preparations may be employed:—

Syrup of Gold, (Powder of gold, gr. xxiv.; simple syrup, f℥j.; mix.)

Ointment of Gold, (Powder of gold, gr. j.; axunge, gr. xv.)

AURI IODIDUM.—*Iodide of Gold.*

PREPARATION.—(French Codex.) "Pour a solution of chloride of gold into a solution of hydriodate of potash, as long as any precipitate falls; filter, and wash the powder well with alcohol, to dissolve out the excess of iodine; and then dry it."

PROPERTIES.—Iodide of gold is a greenish-yellow powder, insoluble in cold, and very sparingly soluble in boiling water. Exposed to a heat of about 300° F. the iodine is driven off, and metallic gold left. It is composed of 2 equivalents of gold and 1 of iodine, Au^2I, (Graham).

THERAPEUTICAL EFFECTS.—This preparation is a very active poison, more so than corrosive sublimate; it is employed in venereal and scrofulous affections internally, in doses of 1-15th to 1-10th of a grain, in the form of powder, or of pill, combined with powdered gum arabic; it is decomposed by most vegetable substances.

AURI PERCHLORIDUM.—*Perchloride of Gold. Sesquichloride of Gold.*

PREPARATION.—(French Codex.) "Pure laminated gold; and nitric acid, of each, one part; hydrochloric acid, two parts; dissolve the gold in the mixed acids with a gentle heat, evaporate till the solution begins to emit chlorine; and set it aside to crystallize by cooling."

PROPERTIES.—Sesquichloride of gold is in the form of needle-shaped, prismatic crystals, of a ruby-red colour; it is inodorous, but has a very styptic, disagreeable taste. In dry air it remains unaltered, but deliquesces rapidly in damp air. Water, alcohol, and ether dissolve this salt; the solution is of a yellow colour, and is acid to litmus paper; exposed to the light, although kept in stoppered bottles, it is decomposed, and gold deposited on the surface. Sesqui-chloride of gold is composed of 2 equivalents of gold and 3 of chlorine, $Au^2 Cl^3$ (Graham).

THERAPEUTICAL EFFECTS.—This salt is the most generally employed of the preparations of gold. It is exceedingly active; so small a dose as 1-15th of a grain has, in the hands of Cullerier, at the second dose produced gastric irritation, dryness of the tongue, redness of the throat, colic, and diarrhœa. It is employed, it is said with much success, in the treatment of syphilitic diseases both primary and secondary, particularly in cases where mercurial preparations fail to do good. It has been also used in scrofulous and herpetic affections, in cancer, &c. As an external application, it has been employed as a caustic to open cancer, to lupus, and to obstinate syphilitic ulcerations.

DOSE AND MODE OF ADMINISTRATION.—It may be given in doses of 1-20th to 1-15th of a grain, once a-day, made into pill with starch, or dissolved in distilled water. The same quantity intimately mixed with gr. v. of starch may be applied by friction to the gums and tongue.

Caustic of Recamier, (Chloride of gold, gr. vj.; dilute nitro-hydrochloric acid, f℥j.; dissolve.) Applied by means of a piece of lint dipped in it; the eschar which forms falls off in a few days, and leaves a clean, healthy surface underneath.

Sodii Auro-terchloridum, FRENCH CODEX. (Chloride of gold, 85 parts; chloride of sodium, 16 parts; dissolve in a small quantity of distilled water; concentrate with a gentle heat, till a pellicle begins to form on the surface; then set aside to crystallize.) Chloride of gold and sodium crystallizes in long four-sided prisms, of an orange-yellow colour; it is employed in the same manner, and in the same doses as sesqui-chloride of gold. It is less expensive, and nearly, if not quite as active. An ointment of it, prepared by mixing, with trituration, 1-10th of a grain with gr. xxxvj. of axunge, may be applied to the skin denuded of the epidermis.

INCOMPATIBLES.—Most metals, and their salts; the alkalies; sugar; gum; charcoal; tannin; extractive.

In poisoning with chloride of gold, or with chloride of gold and sodium, the same treatment should be adopted as in poisoning with corrosive sublimate.

AURI PEROXYDUM.—*Peroxide of Gold. Sesqui-oxide of Gold. Auric acid.*

PREPARATION.—(French Codex.) "Chloride of gold, 1 part; calcined magnesia, 4 parts; water, 40 parts; boil gently for a short time; wash the precipitate repeatedly with water until the washings no longer precipitate with solution of nitrate of silver; and then digest in cold diluted nitric acid, to dissolve out the magnesia; dry the residuum without heat and in the dark."

PROPERTIES.—Auric acid is of a chestnut-brown colour, becoming yellowish when moistened. It is insoluble in water; is rapidly decomposed by exposure to light or heat; and combines with alkalies to form salts. It is composed of 2 equivalents of gold, and 3 of oxygen, $Au^2 O^3$ (Berzelius.)

THERAPEUTICAL EFFECTS.—It is used in the same cases as the other preparations of this metal, and has been especially recommended by M. Legrand for the treatment of scrofulous diseases of the bones. Dose, 1-10th of a grain to 1-4th of a grain.

Pills of oxide of Gold, MAGENDIE. (Oxide of gold, gr. vj.; extract of mezereon, ʒij.; divide into 60 pills.) Dose, 2 to 10 daily.

BROMINEUM.—*Bromine.* This elementary fluid body was originally introduced into the London Pharmacopœia merely as being employed in the preparation of *Bromide of potassium;* the salt, however, and consequently the element itself, have been omitted from the last edition, their employment in medicine having nearly fallen into disuse. Nevertheless, as they had been used for some years as substitutes for iodine and iodide of potassium, in consequence of the high price and scarcity of these substances, and as their therapeutical action appears to be nearly identical with them, I shall at present retain the notices of bromine and bromide of potassium which have appeared in previous editions of this book.

PREPARATION.—It is obtained from sea water, and from the waters of many mineral springs,—in which it exists in the forms of bromide of magnesium and bromide of sodium,—by first saturating with chlorine gas to separate it from the base, adding ether which dissolves out the bromine, and then separating from the ether by means of solution of caustic potash, which combines with the bromine, forming bromide of potassium; from this salt it is obtained by a process similar to that for procuring iodine. Of late years it has been prepared in large quantities in the United States, having been discovered in many of the brine springs throughout the state of New York.

PHYSICAL PROPERTIES.—At ordinary temperatures, bromine is a heavy, dark reddish-brown liquid, of a hyacinth-red colour when viewed by transmitted light. Its odour resembles that of chlorine, but it is much stronger and more disagreeable, whence its name (Βρῶμος, fetid.) Its taste is very acrid. Specific gravity, 2·99.

CHEMICAL PROPERTIES.—Bromine is an elementary substance. It is scarcely soluble in water, and its solubility is not sensibly augmented by heat; is rather more soluble in alcohol, and still more so in ether; and is very volatile, boiling at a temperature of 113°. Bromine bleaches vegetable colours like chlorine. It combines with most metals, forming bromides with them.

THERAPEUTICAL EFFECTS.—As remarked above, it is as a substitute for iodine that bromine is employed in medicine; with which it appears to be nearly if not quite identical in action.

DOSE AND MODE OF ADMINISTRATION.—It is seldom used in the uncombined state, but the following solution has been employed by M. Pourche as a substitute for tincture of iodine:—Bromine one part; distilled water, forty parts; dissolve. Dose, min. v. to min. vj. in some aqueous vehicle three or four times a-day. For external use a preparation four times the strength of this may be employed. The *bromide of potassium* and *bromide of iron* will be described hereafter. The other combinations of bromine which have been used in medicine are the following:—*Bromide of barium,* which is soluble in water, is given in doses of one to five grains three times a-day: the ointment is prepared by combining it with lard in the proportion of one part to ten. *Bromide of calcium* is prescribed in the form of pill made with conserve of roses; the dose of it is from three to ten grains. Two *bromides of mercury* have been used: the first, a sub-bromide, is a white insoluble powder; the dose of it is one to two grains daily: the second, a bromide, is fusible and volatile, and soluble both in water and alcohol; its dose is 1-16th of a grain, gradually increased to 1-4th of a grain daily.

COPAIBA, L. E. COPAIFERA OFFICINALIS, BALSAMUM, D.—*Copaiva. Balsam of Copaiva. Various species of the Copaifera yield the Copaiva balsam of commerce,* D. *An oleo-resin flowing from incisions into the trunk of Copaifera multijuga, and of other species,* L. *Fluid resinous exudation of various species of Copaifera,* E. The various species of the genus Copaifera from which the balsam is obtained are natives of South America and the West Indian islands; they belong to the Natural family *Leguminosæ (Fabaceæ,* Lindley), and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—Trees, 20–35 feet high; Leaves, abruptly pinnate; Leaflets, coriaceous, somewhat unequal, ovate; Flowers, in panicles.

PREPARATION.—The liquid resin exists in great abundance in the trees; it is procured by making deep incisions into the stem in the hot summer months, when in some instances 12 pounds of juice will exude in three hours. Many trees yield copaiva twice or three times in the year.

PHYSICAL PROPERTIES.—*Copaiva*, or as it is commonly but improperly called *Balsam of Copaiva*, is a transparent, oily liquid, of a pale-yellow colour,—inferior kinds are dark yellow. It has a strong, peculiar, and to most persons very disagreeable odour, and a bitter, acrid, very permanent and exceedingly unpleasant taste. Specific gravity from ·950 to ·966, becoming denser by age.

CHEMICAL PROPERTIES.—Fresh copaiba is composed of 41 per cent. of volatile oil, 51·38 per cent. of hard yellow resin *(copaivic acid)*, 2·18 of brown soft resin, and 5·44 of water (Gerber.) Exposed to the air it gradually thickens, and becomes darker coloured. It is insoluble in water, but is completely soluble in alcohol, ether, and the fixed and volatile oils. It dissolves magnesia and its carbonate, and forms with them after four or five hours a translucent mass, sufficiently consistent for pills. The volatile oil of copaiva *(Copaibæ Oleum)*, which is officinal in both the London and Edinburgh Pharmacopœias, being an article of the Materia Medica in the former, is obtained by distillation with water. It is transparent and colourless, has a density of 0·878, boils at 473°, and is soluble in alcohol and ether. Its composition is isomeric with that of oil of turpentine, being $C^{10}H^{8}$. *Copaivic acid* is composed of $C^{40}H^{32}O^{4}$; it is of a reddish-yellow colour, brittle with a crystalline fracture; soluble in alcohol, ether, and the volatile and fixed oils; the alcoholic solution reddens litmus paper. By distilling off the oil from copaiba, a brownish, soft resinous mass is left, which retains somewhat the odour of the balsam; this, which is sold in the shops as Copaiba-resin, is a compound of two resins, the one *Copaivic acid*, which may be dissolved out by rectified spirit, and the other a viscid resinous mass.

ADULTERATIONS.—Copaiva is very much adulterated, so much so that it is difficult to meet with a perfectly pure specimen. The impurities usually found in it are oil of turpentine, and more recently, as pointed out by Mr. Redwood, the distilled oil of the *Gurjun balsam*—the produce of a species of Dipterocarpus, or some fixed oil, as castor-oil, poppy-seed oil, rape-oil, &c. Oil of turpentine, or any other volatile oil, is readily discovered by the odour, when it is dropped on a heated spatula. The presence of any fixed oil may be detected by the greasy areola which surrounds the spot of resin left, on gently evaporating, over the flame of a lamp, a drop or two of the suspected balsam on unsized paper. The tests of the *Edinburgh Pharmacopœia* for its purity are as follows:—"Transparent; free of turpentine odour when heated; soluble in two parts of alcohol; it dissolves a fourth of its weight of carbonate of magnesia, with the aid of a gentle heat, and continues translucent." To these may be added Planche's test for the usual adulteration, that with castor-oil,—"pure balsam agitated with solution of ammonia, of the density ·965, becomes clear and transparent in a few moments; but remains turbid if castor-oil be present." These tests are, however, not to be depended on ; the only satisfactory means of ascertaining the goodness of copaiva, as has been suggested by Mr. Redwood, being, the obtaining the oil by distillation :—pure specimens yield nearly 60 per cent., while those of inferior quality do not afford more than 30.

THERAPEUTICAL EFFECTS.—Copaiva is a special stimulant to the mucous membranes, its action being particularly directed to the bladder and urethra. In many instances its administration is followed by a cutaneous eruption which closely resembles urticaria ; and when given in large doses it produces vomiting and purging. The principal use of copaiva is in the treatment of gonorrhœa, for which it is undoubtedly the best remedy with which we are acquainted. The practice is still followed by many, of not administering copaiva in this disease, until all inflammatory symptoms are subdued by antiphlogistic treatment. But the majority of surgeons in the present day prescribe it in the very earliest stage, and with the best results ; indeed the earlier it is given, the more speedy and the more effectual will be the cure. In the treatment of gonorrhœa, the use of copaiva should be always continued for 8 or 10 days after the discharge has completely ceased. Copaiva has been also employed with benefit in leucorrhœa, in chronic catarrh of the bladder, in the chronic bronchitis of the old and debilitated, especially when the bronchial secretion is profuse, and in chronic dysentery. In most cases where the use of this medicine has been continued for a few days, its presence may be recognised in the urine by heating that secretion as in the process for detecting albumen, when it will present a milky aspect; this is a fact to be always borne in mind as it might lead to error from simulating the presence of albumen in the urine ; it may be distinguished from that abnormal product by its not subsiding to the bottom of the vessel after a few hours rest as albumen does.

DOSE AND MODE OF ADMINISTRATION.—Min. x. to fʒj. In consequence of its very nauseous taste, a great many ways have been proposed for administering copaiva ; but it appears to me to act with greater certainty, and to cause less disgust when given floating on a wine-glass of water to which a drachm of some aromatic tincture, as tincture of orange-peel, has been added. It is sometimes prescribed in the form of pill prepared by boiling the balsam with calcined magnesia or with hydrate of lime ; a sufficient degree of consistency will be obtained in 4 or 5 hours with the latter, while from 12 to 15 hours will be required to produce the same result with the former. The process of M. Thierry is as follows :—Rub together in a marble mortar 15 parts of *pure* copaiva, and 1 part of hydrate of lime (or 2 parts of calcined magnesia) ; put the mixture over a water-bath, and stir from time to time till the lime has disappeared ; keep up the fire for 4 hours, or for 15 hours if magnesia be used. The mass may be divided into gr. vj pills, of which from 6 to 12 may be taken two or three times daily.

More recently copaiva has been administered enclosed in gelatine capsules, for preparing which the following method is followed:—the polished bulbous extremities of iron rods are oiled with almond oil, and then dipped into a warm concentrated aqueous solution of ordinary or bleached gelatine, which is of the consistence of thick honey; they are then rotated quickly till the gelatine congeals, when the capsules are to be removed gently with three fingers, and laid on a loose hair-sieve to dry; when perfectly dry they are filled to the margin by means of a glass drop tube with copaiva, and the mouth closed with a little of the warm solution of gelatine (*Steege.*) *Gelatine capsules of copaiva* contain, each, about gr. x. of balsam; but a spurious sort is very commonly sold in which the capsules are filled with train oil.

M. Jozeau has recently proposed to administer copaiba in the form of saccharated capsules in the treatment of gonorrhœa; these he terms *Copahine-Mège,* because M. Mège was associated with him in their preparation; they are stated not to occasion nausea, sickness or purging, and their therapeutical efficacy has now been well proved. They are prepared as follows:—Copaiba is surcharged with oxygen by means of nitric acid, the latter being added in proportions varying with the copaiba acted upon. It is then well washed with water to remove all traces of the acid, which is effected when it no longer reddens litmus paper. A tenth part of cubebs in fine powder, the same quantity of carbonate of soda, and a sixteenth part of calcined magnesia are added to it; the mixture is allowed to stand until it is quite solidified, and then made into small masses of the size of sugar plums and covered with sugar which has been coloured with cochineal. When there is neither pain nor inflammation present, five of these saccharated capsules are taken three times a-day, and the dose increased by one capsule every day until purging is produced.

The nostrum known as *Frank's specific solution*—now nearly fallen into disuse—may be very closely imitated as follows:—Copaiva, 2 parts; liquor potassæ *vel* sodæ, 3 parts; distilled water, 7 parts; boil for a quarter of an hour, then add spirit of nitric ether, 1 part; allow it to stand a few hours, and draw off the clear liquor by means of an orifice in the lower part of the vessel. The dose of this mixture is fʒij. three times a-day.

Copaiba is also administered in the form of *enema,* the bulk of which should be small, from fʒj. to fʒij. of copaiba to f℥vj. of decoction of barley.

Oleum Copaibæ, L. E. The oil is preferred by many to any other preparation of copaiva, but I have seen it frequently fail to do good; the dose is from min. xv. to min. xxx. dropped on sugar.

Resina Copaibæ. This preparation is very properly discarded from practice; the dose of it is from gr. x. to ʒss.

CUBEBA, L. E. CUBEBA OFFICINALIS, D.—*Cubebs. Berries of Cubeba officinalis, D. Unripe fruit* (*Fruit,* E.) *of Piper* *cubeba,* L. E. A native of Java and the Prince of Wales' Island; belonging to the Natural family *Piperaceæ,* and to the Linnæan class and order *Diandria Trigynia.*

BOTANICAL CHARACTERS.—Stem, sarmentaceous, articulated, terete; Leaves, petiolated, oval, coriaceous; Flowers, on an elongated, pendant spadix; Fruit, a pedunculated small berry, the peduncles are nearly equal to the petiole.

PHYSICAL PROPERTIES.—Cubebs are the dried unripe berries; they are about the size of black pepper, wrinkled on the surface, brownish externally, whitish and oily within. They have a small portion of the peduncle attached, whence the name *piper caudatum* has been applied to them. Their odour is strong, peculiar, aromatic; their taste warm, pungent and very spicy.

CHEMICAL PROPERTIES.—Cubebs are composed of 2·5 per cent. of green volatile oil, 1 per cent. of yellow volatile oil, 4·5 of a peculiar principle named *Cubebin* (which is probably identical with *Piperin,*) 1·5 of balsamic resin and wax, lignin, &c. The volatile oil, *Oleum Cubebæ,* D. E., is obtained by the usual process of distillation with water; it is of a pale greenish-yellow colour, transparent and limpid, with the peculiar odour and taste of cubebs. Its density is 0·929; and its composition C^{15} H^{12}, being isomeric with oil of turpentine. Cubebs yield their properties very partially to boiling water, but completely to alcohol.

THERAPEUTICAL EFFECTS.—Cubebs possess the stimulant and carminative properties of the other peppers; but they also exercise a specific influence on the urinary organs, indicated by their power in arresting urethral discharges. They are only employed in medicine, in the treatment of gonorrhœa for which they are held by many to be as efficacious if not more so than copaiva Nothing is known as to the manner in which cubebs cure gonorrhœa; but their specific influence appears to be exercised chiefly if not only in the early stages of the disease, so that they usually fail to prove beneficial when the discharge has existed for any time; they should be therefore administered on its first appearance, when if the running be not checked in from three to five days, their continued use will in most instances do more harm than good. Cubebs have been also employed in leucorrhœa and in catarrh of the bladder, with doubtful benefit.

DOSE AND MODE OF ADMINISTRATION.—In powder, which is the best form, ʒj. to ʒiij. three times a-day. The powder should be always prepared fresh for use, as owing to the volatility of the oil, it deteriorates rapidly. The larger the dose in which cubebs are given, the more certain will be their effect; they may be administered suspended in milk or in water, or in combination with copaiva.

Oleum Cubebæ, D. E. (Prepared according to the general directions for distilling volatile oils, see page 201.) Dose, min. x. to min. xxx. dropped on sugar; it is not so certain in its effects as the powder.

Tinctura Cubebæ, D. L. ("Cubebs, bruised, ℥v.; rectified spirit, Oij. ; macerate for fourteen days, strain, express, and filter," D. "Cubebs, bruised, ℔j. ; proof spirit, Oij. ; macerate for seven days, express and filter," L.) This tincture is generally added to mixtures containing copaiva. Dose, fʒj. to fʒij.

HYDRARGYRUM, D. L. E.—*Mercury. Quicksilver.* Mercury is met with in the metallic state in the quicksilver mines of South America. It is principally brought to England from Almaden in Spain, from Idria in Illyria, and from Moschel in Bavaria, where it is extracted from the native sulphuret, *Cinnabar.*

PREPARATION.—Metallic mercury is procured from cinnabar either by distilling with caustic lime or by roasting the ore. As met with in commerce, it is in general sufficiently pure for medical purposes; the London College, however, directs it to be strained, and in the Dublin Pharmacopœia a process is contained for purifying it :—HYDRARGYRUM PURUM, D. "Take of quicksilver of commerce, ℔iij. ; pure muriatic acid, f℥ss. ; distilled water, f℥ij. Having introduced the quicksilver into a small glass retort, over the body of which a hood of sheet iron is supported, let the heat of a gas-lamp be applied until two-thirds of the metal have distilled over. Boil this for a few minutes with the acid and water, and having, by repeated affusion of distilled water, and decantation, removed the entire of the acid, let the metal be poured into a capsule, and dried by the application of heat."

PHYSICAL PROPERTIES.—At ordinary temperatures, mercury is liquid; it has a silver-white colour with a bluish shade, and is very brilliant. Its specific gravity is 13·56 when liquid, and 15·612 when solid.

CHEMICAL PROPERTIES.—Mercury is a simple metallic substance, its symbol being Hg. It boils at 662°, and solidifies at 39° or 40° below zero, crystallizing in regular octohedrons ; exposed to the air at the usual temperature, it remains unaltered if pure, but otherwise the surface soon tarnishes. Agitated for some time in contact with the air, it is converted into a greyish-black powder which was formerly called *Æthiops per se ;* this, according to some chemists, is a suboxide of mercury, but according to others it is the metal in a state of very minute division. Mercury combines with most metals to form *amalgams ;* the smallest trace of it communicates a white stain to gold or silver.

ADULTERATIONS.—Tests for the purity of metallic mercury are given by the London and Edinburgh Colleges.—"Its specific gravity is 13·5. Totally dissipated in vapour by heat. Globules rolled slowly on a sheet of paper leave no stain upon it," L. "Entirely sublimed by heat; a globule moved along a sheet of paper leaves no trail ; pure sulphuric acid agitated with it evaporates when heated without leaving any residuum," E. By the application of these tests, the usual metallic adulterations with tin, lead, zinc, or bismuth, are readily detected.

THERAPEUTICAL EFFECTS.—As long as mercury remains in the state of metal, it is now generally agreed that it does not exercise any influence on the human body, and that in all cases in which its

its specific action is manifested, it had been first converted into oxides or salts. The inhalation of mercurial vapours, which, as has been recently proved, contain some oxide, for any lengthened period, produces a singular train of symptoms principally affecting the nervous system ; the most remarkable of these is the *shaking palsy* or *tremblement metallique*, in which the muscles of the arms become so unsteady, as almost to place them completely out of the control of the individual. This affection is not uncommon amongst the workers in quicksilver mines, gilders, and others whose trade exposes them to the vapour of this metal. To cure the disease, the patient must be removed from the contaminated atmosphere which has produced it, and get nourishing diet, with tonics, more particularly preparations of iron. The shower-bath, and magnetic electricity (see page 392,) are also powerful auxiliaries in restoring the nerves to a healthy state. More recently Professor Melsens, of Brussels, has proposed the employment of iodide of potassium for the removal of the symptoms caused by mercurial poisoning, and published some cases in which its use proved altogether effectual.

The effects on the human body of the different preparations of mercury which are employed in medicine are very complex, and as they are possessed in common by most of the mercurial compounds, they may be most conveniently considered here.

The *topical* effects of the preparations of mercury are generally somewhat irritant, *remotely* they act as special stimulants both to secretion and excretion. The most remarkable effect of mercury is its action on the salivary glands, *salivation*. When this medicine is introduced into the system in such a manner as to excite this peculiar state, it at first produces increased vascular action, shortly followed by a metallic or brassy taste in the mouth, and a slight mercurial fetor of the breath; the gums become somewhat swollen and spongy at their edges, soon presenting a slight degree of ulceration ; the lining membrane of the cheeks and sometimes also of the palate, acquires a leaden hue, and is swollen ; and an increased flow of saliva takes place, accompanied by pain in the teeth on the least pressure. If these symptoms be allowed to advance, or if more mercury be administered, the cheeks, the tongue, and the throat swell and ulcerate, and a copious flow of saliva sometimes amounting to several pints in the twenty-four hours, is induced; this excessive salivation is accompanied by slow fever and rapid emaciation. The quantity of a mercurial preparation required, or the length of time for which it must be administered, to produce the above effects, varies exceedingly in different constitutions and under different circumstances. Individuals are sometimes met with, in whom almost the minutest dose of any preparation of mercury will produce most violent salivation; while on the other hand, some persons appear to be totally insensible to this peculiar operation of the drug.

It has been held by many that the production of this specific effect of mercury is necessary to the development of its curative powers, and most unquestionably it occurs, that in the majority of instances its sanatory influence in the treatment of disease is contemporaneous with its action on the salivary glands. Great attention, however, must be always paid not to allow salivation to proceed too far, as a frightful train of symptoms, in many instances followed by death itself; is the usual result of excessive salivation. In the early stage, mercurialism is most decidedly checked by the administration of active saline cathartics, or nauseating doses of tartar emetic, and by keeping the surface of the body warm, and the face and neck cool.

Salivation is very rarely produced in children below the age of ten years by the action of mercury, and they consequently bear the administration of comparatively larger doses of any preparation of mercury than adults; nevertheless, instances do occasionally occur in which even at a very early age, the mouth and gums become affected by it; and I have myself witnessed its occurrence in a child not quite two years old. In infants and very young children to whom mercury has been for some time administered, a discharge of several copious fetid green stools is to be regarded as an evidence that the system has been saturated with the metal, and to be looked upon in the same light as the occurrence of salivation in more advanced life.

The effects of mercury on the system are sometimes accompanied by a peculiarly alarming state, first described by Mr. Pearson, under the name of "*mercurial erethism*;" "it is characterized by great depression of strength, a sense of anxiety about the præcordia, frequent sighing, trembling partial or universal, a small quick and sometimes intermitting pulse, occasional vomiting, a sense of coldness, and pale contracted countenance, but the tongue is seldom furred nor are the vital or natural functions much disordered." When these or the greater part of these symptoms are present, any sudden or violent exertion of the animal powers, such as rising suddenly in bed, will often prove fatal. These symptoms are best combated by an immediate discontinuance of the mercury, the exhibition of cordials and opiates,—the latter of which I have found especially beneficial,—in small but frequent doses, and rest in the horizontal posture, with free exposure in the open air both by day and night. The use of mercurials is also frequently attended with, or followed by several forms of diseases of the skin: of these the most important is *mercurial eczema*, which often occurs when only a very small quantity of a mercurial preparation has been taken. In its milder forms, it resembles the acute stage of *eczema rubrum*, arising from other causes; but it more frequently assumes a much severer character, when it is ushered in by fever, difficult respiration, dry cough, and tightness across the chest, with a general smarting and burning feel of the skin over the whole body. These symptoms are soon followed by an eruption of minute vesicles, which break and discharge a very fetid fluid. As the disease increases in severity, the eruption extends over the face and the whole of the body, which become covered with incrustations; the fever assumes a typhoid type, the difficulty of breathing increases and is accompanied by bloody expectoration; spots of purpura appear, and death ensues, preceded by delirium or convulsions. On the first appearance of this eruption, the use of mercury ought to be immediately relinquished, and the accompanying symptoms treated by the means appropriate for the individual case, any account of which would be quite foreign to the scope of this work.

The therapeutical powers of mercury, and for which it is employed in the treatment of disease, depend on its properties as an *anti-phlogistic*, an *anti-syphilitic*, an *alterative*, and a *deobstruent*. An account of the most important diseases for which mercurials are administered is subjoined, but only a very general allusion can be made to them they are so numerous.

In *inflammatory diseases*, both acute and chronic, mercury is very much employed: it is peculiarly adapted for those forms of inflammation which frequently result in the effusion of coagulable lymph or of serum; amongst which may be enumerated croup, laryngitis, pleuritis, pneumonia, pericarditis, peritonitis (particularly that form of it which attacks lying-in-women,) meningitis, &c. In all these diseases the previous use of local blood-letting is in most cases attended with advantage, and the mercurial—calomel and hydrargyrum cum cretâ are the preparations best adapted—should be introduced into the system as quickly as possible, so as just *to touch the gums*, but the production of free salivation usually proves injurious. In iritis, mercury is the chief remedy on which reliance is to be placed. In hepatitis, in nephritis, in metritis, and in synovitis, its use is productive of decided benefit. In epidemic dysentery, and in pestilential cholera, especially when occurring in warm climates, very large doses of calomel given at the very onset of the disease, will frequently cut it short; as this power, however, is possessed by calomel alone, it will be again referred to. In the fevers of our climate, unless when inflammation of some particular organ is present, the use of mercury is injurious; but in fevers of warm climates it is for the most part found to be serviceable. The curative powers of mercury in inflammatory diseases depend much on the character of the inflammation; thus, while it generally acts beneficially in simple acute inflammations, and in those of a syphilitic character, it is less serviceable in rheumatic and seldom admissible in scrofulous inflammation.

The history of the *syphilitic disease* is closely connected with that of mercury, as for many hundred years it was supposed to be completely incurable without the long-continued use of mercurials, and in large quantity. Of late, however, it has been established on very satisfactory evidence that most, if not all, cases of syphilis may be cured by its guarded administration in minute doses, aided by simple local and general treatment. Indeed by some it is considered that mercury is not at all required in the treatment of syphilis in any of its stages, but the general experience of the present age is that when judiciously employed, so as to produce a moderate ptyalism, mercury cures the disease more rapidly, and affords greater security against relapses.

In chronic enlargements of the abdominal viscera unconnected with malignant disease, in glandular swellings, in morbid depositions, in adhesions of parts consequent on inflammation, where hemorrhage has taken place into the substance of the brain or of the lungs, and for the removal of effusions into any of the shut cavities of the body, mercury, administered so as to produce its specific action, generally proves very efficacious. In paralysis, especially when dependant on derangements of the brain and nervous system, its use is often attended with decided benefit. In many other diseases of the nervous system, as in hydrocephalus, in mania, in epilepsy, in chorea, in tetanus, in hysteria, in tic doloureux, &c., mercury has been also employed in many instances with advantage.

DOSE AND MODE OF ADMINISTRATION.—To remove obstruction of the bowels, metallic mercury has been given in doses of one or two pounds, followed by active cathartics, but the absurdity of the principle on which it was administered, that of acting as a mechanical agent, is too manifest to require any observation. As before remarked, the specific action of mercury is not manifested so long as it retains the metallic state; but as there are some general rules which apply equally to the different mercurial preparations employed to produce salivation, they will be most conveniently considered in this place. And first, with respect to preparatory treatment: it will be always advisable, in acute inflammations, to subdue the severity of the symptoms by antiphlogistic measures, and in broken down or enfeebled constitutions, to strengthen the system by the use of tonics, previously to the administration of mercury. Owing to the neglect of these precautions, it frequently occurs that the physician is baffled in his attempts to produce ptyalism, or when produced, it is excessive, and with great difficulty controlled. "I am strongly of opinion," says the late Mr. Colles, in his valuable work on the Venereal Disease, "that the want of a due preparatory process has of late years contributed to bring this valuable remedy into much disrepute." With respect to the general treatment during a mercurial course, the most important points to be observed are, the necessity of rest and quietness of both mind and body, the maintaining the temperature of the surface uniform by warm clothing, and the use of a moderate diet, free from all stimulating food and drink.

In the following preparations, a portion of the mercury is converted into the sub-oxide, but the greater part of it is merely mechanically reduced to a finely divided state.

Pilulæ Hydrargyri, D. L. E. (See page 117.) Dose gr. iij. to gr. v., night and morning; if it should occasion irritation, a fourth of a grain of opium may be added to each pill.

Hydrargyrum cum Cretâ, D. L. E. (See page 116.) This is the mildest preparation of mercury; nevertheless, perhaps, the most certain for the production of salivation, not even excepting calomel, over which it possesses the advantage of not being apt to run off by the bowels; it is also from its mildness and certainty of action especially adapted for weak and enfeebled habits, and is very properly preferred to any other in the diseases of infancy and childhood. It may be given in doses of from gr. ij. to gr. v. three or four times daily; but if it be desirable to produce a rapid action on the system, gr. ij. may be given every second or third hour; these observations apply also to the following preparation:—

Hydrargyrum cum Magnesiâ, D. (See page 117.)

Unguentum Hydrargyri, D. L. E. ("Pure mercury; prepared lard, of each, ℔j.; rub them together until metallic globules cease to be visible to the naked eye," D. "Mercury, ℔j.; lard, ℥xiss.; suet, ℥ss.; triturate first the mercury with the suet and a little of the lard till globules are no longer visible, then add the rest of the lard and rub together," L. "Mercury, ℔ij.; axunge, ℥xxiij.; suet, ℥j.; triturate the mercury with the suet, and a little of the axunge till globules are no longer visible; then add the rest of the axunge and mix the whole thoroughly. This ointment is not well prepared so long as metallic globules may be seen in it with a magnifier of four powers. The ointment with these proportions may be diluted at pleasure with twice or thrice its weight of axunge," E.) Mercurial ointment is frequently employed for introducing mercury into the system; and for this purpose, ʒss. to ʒj. of the stronger ointment may be rubbed carefully into the inside of the thighs or arms night and morning. Should it be desirable to produce speedy salivation, it may be used as a dressing to blistered surfaces, and ʒj. or ʒij. placed in each axilla. When employed to promote the dispersion of glandular enlargements, it should be rubbed over the seat of the disease. Mercurial ointment is also smeared over the inflamed surface in phlegmonous erysipelas,—a practice often productive of very beneficial results. A milder ointment is generally used as a dressing to venereal sores.

Ceratum Hydrargyri compositum, L. (Ointment of mercury; compound soap cerate, of each, ℥vj.; camphor, ℥iss.; rub together.) Employed to promote the dispersion of indolent tumours, and as an application to chronic enlargements of the joints.

Linimentum Hydrargyri compositum, D. *Linimentum Hydrargyri*, L. ("Take of ointment of mercury, ℥j.; camphor liniment; solution of ammonia, of each, f℥j. Melt the ointment in the liniment, with a gentle heat, then add the ammonia, and mix them with agitation," D. "Mercurial ointment; lard, of each, ℥iv.; camphor, ℥j.; rectified spirit, fʒj.; solution of ammonia, f℥iv.; rub the camphor first with the spirit, then with the lard and ointment; lastly, the solution of ammonia being gradually poured in, mix them all," L.) A stimulating liniment, applied to indolent tumours, &c.; fʒj. contains nearly gr. x. of mercury. It produces salivation very speedily.

Emplastrum Hydrargyri, D. L. E. ("Take of pure mercury, ℥vj.; resin, ℥ij.; oil of turpentine, f℥j.; litharge plaster, ℥xij. Dissolve the resin in the turpentine with the aid of heat, add the mercury, and rub them together until metallic globules cease to be visible, and the mixture assumes a dark gray colour; then add the litharge plaster, previously melted, and stir the mixture constantly until it stiffens on cooling," D. "Mercury, ℥iij. ; lead plaster, ℔j. ; olive oil, fʒj. ; sulphur, gr. viij. ; add the sulphur gradually to the heated oil, stirring constantly with a spatula till they unite; afterwards rub the mercury with them until globules are no longer visible; then gradually add the plaster of lead melted with a slow fire, and mix them all," L. "Mercury, ℥iij. ; litharge plaster, ℥vj. ; olive oil, fʒix. ; resin, ℥j. ; melt the resin and oil, let them cool, add the mercury, triturate till the globules disappear, add the plaster previously melted, and mix the whole well," E.) Applied as a resolvent in glandular enlargements, and over the region of the liver in chronic induration of that organ.

Emplastrum Ammoniaci cum Hydrargyro, D. L. E. ("Take of ammoniac plaster, ℥iv. ; mercurial plaster, ℥viij. Melt them together by means of a steam or water bath, and stir constantly, until the mixture stiffens on cooling," D. "Prepared ammoniac, ℔j. ; mercury, ℥iij. ; olive oil, fʒj. ; sulphur, gr. viij. ; add the sulphur gradually to the oil heated, stirring constantly with a spatula until they unite ; then rub the mercury with them until globules are no longer visible ; finally the melted ammoniac being gradually added, mix all together," L. "Ammoniac, ℔j. ; mercury, ℥iij. ; olive oil, fʒj. ; sulphur, gr. viij. ; heat the oil, add the sulphur by degrees, stir them till they unite, add the mercury and triturate till the globules disappear, then add also the ammoniac previously liquefied and mix the whole carefully," E.) Applied to indolent buboes, enlarged glands, especially when of a syphilitic origin, to venereal nodes, and as a resolvent in many diseases.

Mercurial Soap, HEBERT. (Take of mercury, and nitric acid, of each, ℥iv. ; put these ingredients into a matrass capable of holding twice the above quantity, and stir the mixture from time to time until the solution shall have been effected at the ordinary temperature of the atmosphere. Introduce into a porcelain capsule, ℔j. ℥j. of calf's fat, melt this by the heat of a water bath, and then add the solution of mercury, stirring the ingredients together till they have acquired an adhesive consistence. To every ℥v. of the ointment thus formed add f℥ij. of caustic solution of soda (density 1·33,) and rub them together on a porphyry slab until combination be effected.) The soap thus formed is perfectly soluble in water. It is employed on the continent with much benefit in the treatment of those cutaneous affections in which preparations of mercury usually prove useful ; it is applied to the parts either alone or dissolved in water; care must be taken to suspend its use if it be found to produce irritation or inflammation.

HYDRARGYRI BICHLORIDUM, L. SUBLIMATUM CORROSIVUM, D. CORROSIVUS SUBLIMATUS, E.—*Bichloride of Mercury. Corrosive Sublimate. Chloride of Mercury.*

PREPARATION.—"Take of sulphate of mercury, ℔x.; dried chloride of sodium, ℔v. Reduce each salt to a fine powder, and, having mixed them carefully by trituration in a mortar, let the mixture be introduced into an iron pot lined with clay, and by a regulated heat applied through the intervention of sand, let the corrosive sublimate be sublimed into an earthen head placed over the pot, and connected to it by means of lute. The product should be preserved in an opaque bottle," D. "Mercury, ℔ij.; sulphuric acid, f℥xxiss.; chloride of sodium, ℔iss.; boil the mercury with the acid till the bipersulphate of mercury remains dry; rub this when it is cold with the chloride in an earthenware mortar, then sublime with a heat gradually raised," L. "Mercury, ℥iv.; sulphuric acid, f℥ij., fʒiij.; nitric acid, f℥ss.; muriate of soda, ℥iij.; mix the acids, dissolve the mercury in them with the aid of a moderate heat; raise the heat so as to obtain a dry salt; triturate this well with the muriate of soda, sublime in a proper apparatus," E.

PHYSICAL PROPERTIES.—Corrosive sublimate is met with in the form of a white, semi-transparent, crystalline mass, or as a white powder; by careful sublimation it may be obtained in regular crystals, the primary form of which is the right rhombic prism. It is inodorous but has an intensely acrid and disagreeable taste. Its specific gravity is 6·5.

CHEMICAL PROPERTIES.—Although this salt is called a bichloride in the London Pharmacopœia, recent chemical investigations prove it to be a proto-chloride, its composition being Hg. Cl. It is permanent in the air; fuses at 590°, and boils at 563°; the vapour is colourless, but very acrid. It is soluble in 16 parts of cold and 3 parts of boiling water, in $2\frac{1}{3}$ parts of cold alcohol and in $1\frac{1}{2}$ of boiling alcohol, and in 3 parts of cold ether. Its solubility is much increased by the addition of hydrochloric acid or of the alkaline muriates. A solution of corrosive sublimate gives a yellow precipitate with hydrates of potash, soda, or lime; a red precipitate with the alkaline mono-carbonates; a scarlet with iodide of potassium; and a black with sulphuretted hydrogen. Dropped on gold it does not tarnish it, but if the moistened surface be touched with a piece of iron or zinc, mercury is immediately precipitated, and leaves a white stain on the gold, which may be removed by heat. Corrosive sublimate may be removed from its solution in water, by agitation with ether.

ADULTERATIONS.—Corrosive sublimate seldom contains any impurities; its subliming without any residuum, and its complete and easy solubility in sulphuric ether, the tests given by the Edinburgh College, are sufficient to detect any adulteration. The following characteristics and tests for this salt are contained in the last edition of the London Pharmacopœia:—"Crystalline, fused by heat, afterwards sublimed; soluble in water, rectified spirit and ether; potash, soda, or lime water, gives a red precipitate with its solution in water, but yellow if added in excess; this on the application of heat evolves oxygen, and leaves globules of mercury."

THERAPEUTICAL EFFECTS.—Corrosive sublimate is a powerful irritant poison, a few grains producing death preceded by rapid and excessive inflammation of the digestive tube, with great derangement of the nervous system and coma. In small repeated doses, it possesses the usual action of a mercurial, but salivation is more slowly produced by it, and its effects are more decidedly *alterative* than those of any other preparation of the metal. It is consequently much employed in the treatment of secondary syphilis by those who believe that ptyalism is not essential to the curative effects of mercury. Corrosive sublimate is also employed with much benefit in chronic cutaneous diseases, especially when of syphilitic origin, in chronic rheumatism, in arthritis, periostitis, &c. ; in which cases it is advantageously combined with a vegetable diaphoretic or tonic. Dissolved in water it forms a useful lotion in some cases of psoriasis, and is an excellent collyrium in the milder forms of ophthalmia.

DOSE AND MODE OF ADMINISTRATION.—1-12th to 1-8th of a grain made into pill with crumb of bread, twice or three times daily. I have even increased the dose to 1-6th of a grain three times daily with excellent effect in some chronic cases of secondary syphilitic disease. For a lotion or collyrium, gr. ss. to gr. j. may be dissolved in f℥j. of distilled water, or the following preparation may be employed.

Liquor Hydrargyri Bichloridi, L. (Bichloride of mercury; hydrochlorate of ammonia, of each, gr. x.; distilled water, Oj. ; dissolve.) Dose, for internal use, f℥ss. to f℥ij.

Pilulæ Corrosivi Sublimati, DZONDI. (Corrosive sublimate, gr. xij.; dissolve in sufficient distilled water, and add crumb of bread, and white sugar, of each, a sufficiency to make 240 pills.) Each of these pills contains a 20th of a grain of sublimate. Dose, 4 daily, to be increased gradually until 30 are taken in the day.

INCOMPATIBLES.—The alkalies and their carbonates ; lime, and its carbonate ; tartar emetic ; nitrate of silver ; acetate of lead, iodide of potassium ; albumen ; soaps ; almond mixture ; decoction of bark, &c.

In cases of poisoning with corrosive sublimate, albumen, as white of egg, is the best antidote ; it should not be given, however, in too great quantity, as the compound formed is soluble in an excess of albumen ; the yolk of egg has been recently proved to be an equally, if not more, efficacious antidote : in their absence, wheaten flour, milk, protochloride of tin, or iron filings may be used. Miahle has proposed the hydrated sulphuret of iron as the best antidote in poisoning with this salt, but Orfila states that it only acts if taken immediately, and that if ten or fifteen minutes elapse before it is administered it is useless.

HYDRARGYRI BICYANIDUM.—*Bicyanide of Mercury. Cyanuret of Mercury. Cyanide of Mercury.* This preparation has been omitted from the last editions of the Dublin and London Pharmacopœias.

PREPARATION.—" Percyanide of iron, ℥viij.; binoxide of mercury, ℥x.; distilled water, Oiv.; boil them together for half an hour and strain. Evaporate the liquor that crystals may be formed. Wash what remains frequently with boiling distilled water; and again evaporate the mixed liquors that crystals may be formed. Bicyanide of mercury may be otherwise prepared by adding as much binoxide of mercury as will accurately saturate it, to hydrocyanic acid distilled from ferrocyanide of potassium with diluted sulphuric acid," *London Pharmacopœia*, 1836.

PHYSICAL PROPERTIES.—This salt is met with crystallized in rectangular prisms; they are transparent or semi-opaque, colourless and inodorous, with a disagreeable metallic taste.

CHEMICAL PROPERTIES.—It is a cyanide of mercury, its composition being Hg Cy; is anhydrous; permanent in the air; and when exposed to heat is resolved into metallic mercury, and cyanogen gas. It is soluble in 8 parts of water at 60°, and in much less boiling water, it is very sparingly soluble in alcohol.

THERAPEUTICAL EFFECTS.—This salt resembles in its effects corrosive sublimate, to which it is preferred by many as being more soluble and not so easily decomposed. In this country, however, it is rarely used in medicine; and was originally introduced into the London Pharmacopœia chiefly as having been employed in the preparation of hydrocyanic acid.

DOSE AND MODE OF ADMINISTRATION.—Same as for corrosive sublimate.

INCOMPATIBLES.—Sulphuric and hydrochloric acids; sulphurretted hydrogen, and hydrosulphates.

HYDRARGYRI BINIODIDUM, E. HYDRARGYRI IODIDUM RUBRUM, D.—*Biniodide of Mercury. Iodide of Mercury. Red Iodide of Mercury.* Omitted from the last edition of the London Pharmacopœia.

PREPARATION.—" Take of corrosive sublimate, ℥j.; iodide of potassium, ʒx.; distilled water, Oij.: or as much as is sufficient. Dissolve the corrosive sublimate with the aid of heat in twenty-five ounces, and the iodide of potassium in five ounces of the water, and when both solutions are cold, mix them. Decant the supernatant liquor when the precipitate has subsided, and having collected this latter upon a paper filter, wash it with the remainder of the water. Finally dry the product at a temperature not exceeding 212°, and preserve it in a close bottle," D. " Mercury, ℥ij.; iodine, ℥iiss.; concentrated solution of muriate of soda, cong. j.; triturate the iodine and mercury together, adding occasionally a little rectified spirit till a uniform red powder be obtained. Reduce the product to fine powder, and dissolve it in the solution of muriate of soda with the aid of brisk ebullition. Filter if necessary, through calico, keeping the funnel hot; wash and dry the crystals which form on cooling," E.

PHYSICAL PROPERTIES.—Red iodide of mercury is a brilliant scarlet powder, which may be obtained in rhomboidal crystals by sublimation. It is inodorous, but has a strong metallic taste. The specific gravity of its vapour is 15·68, being the heaviest gaseous substance known.

CHEMICAL PROPERTIES.—It is composed of one equivalent of mercury, and one of iodine, Hg I. It is permanent in the air, heated moderately becomes yellow, at a temperature of 400° fuses, and at a higher temperature sublimes. Cooled rapidly it recovers its red colour, but when cooled slowly it remains yellow, in which state when rubbed, the red tint is immediately reproduced. It requires more than 6000 times its weight of water for solution; but is much more soluble in alcohol and acids, particularly with the aid of heat. It is soluble in a boiling solution of common salt, but a mere trace only is retained as it cools. It is also soluble in a solution of iodide of potassium.

ADULTERATIONS.—Owing to faulty preparation, iodide of mercury is apt to contain some of the sesqui- or sub-iodide; it may also contain sulphuret of mercury, derived from impurity in the metallic mercury employed. These as well as any fixed impurity are guarded against by the tests of the *Edinburgh Pharmacopœia*:—"Entirely vaporizable; soluble entirely in 40 parts of a concentrated solution of muriate of soda at 212°, and again deposited in fine red crystals on cooling."

THERAPEUTICAL EFFECTS.—The red iodide of mercury is an exceedingly active preparation, producing violent inflammation when placed in contact with the skin. In medicinal properties it appears to resemble much corrosive sublimate, and may be employed in the same cases. In doses of 1-12th of a grain given twice daily, and continued for some time, I have found it an excellent tonic in scrofulous habits. I have also used it extensively with very beneficial effects in the treatment of organic diseases of the heart, more especially in those valvular affections which permit regurgitation. As a topical remedy, it is applied with benefit in the form of ointment to chronic glandular and periostitic enlargements, especially when of syphilitic origin. Its use, however, requires much caution, especially when applied to raw surfaces. More recently it has been employed successfully in the treatment of goitre in the East Indies by Dr. Mouat. An ointment containing it being spread over the enlarged thyroid which is then exposed to the direct rays of the hot sun. An account of this practice will be found in the 24th volume of the *Dublin Quarterly Journal of Medical Science*, page 500.

DOSE AND MODE OF ADMINISTRATION.—Gr. 1-16th to gr. 1-8th made into pill with any of the tonic vegetable extracts.

Unguentum Hydrargyri Iodidi rubri, D. (Take of red iodide of mercury, ʒj.; ointment of white wax, ʒvij. Incorporate the iodide of mercury and ointment by careful trituration in a mortar.) This ointment is much too strong for ordinary use, and should be further diluted with 3 or 4 times its weight of lard.

HYDRARGYRI CHLORIDUM, L. CALOMELAS, D. E.—*Calomel* (described in the divison *Cathartics*), is the most generally used, and one the mildest preparations of mercury. It may be employed to produce the general effects of mercurials as before described; but it is almost exclusively administered in the treatment of inflammatory and febrile affections, in which it is usually given in combination with small doses of opium, which promote its antiphlogistic powers and prevent it from acting on the bowels. As a *sedative* in dysentery and in epidemic cholera, its use has been before alluded to (see page 435); in these diseases, it is given in very large doses,—a scruple every hour or every second hour until two or three drachms are taken, or in single doses of ʒss. to ʒij.,—with the very best effects. In the late epidemics of cholera in Europe, however, its administration in small doses frequently repeated, one or two grains every five or ten minutes, obtained many advocates. As an *alterative* it is very generally administered to children, who, as before remarked are not nearly so susceptible to the influence of calomel, or indeed of any other mercurial, as adults. To produce ptyalism, this is perhaps the most convenient of all the mercurial compounds, as salivation may be produced with it in a very short space of time, and with very little disturbance to the system generally. Its use as a cathartic has been before described (see page 103.) Calomel is also added to other medicines to promote their peculiar effects; thus it is combined with digitalis or squill, to produce *diuresis;* and with Dover's powder or antimonials to increase their *diaphoretic* properties.

DOSE AND MODE OF ADMINISTRATION.—As an *antiphlogistic,* gr. iij. to gr. v. combined with one-fourth to one-half of a grain of opium. As an *alterative,* gr. j. to gr. iij. twice a day. To produce *ptyalism,* gr. iij. to gr. v. are usually given night and morning; but by administering calomel in grain doses every hour, a sixth of a grain of opium being added to each dose should it affect the bowels, salivation may be produced in from 12 to 24 hours, provided proper preparatory treatment has been employed.

Pilulæ Calomelanos compositæ, (see page 178). Dose as an alterative, gr. v. to gr. x.

Pilulæ Calomelanos et Opii, E, (Calomel, 3 parts; opium 1 part; conserve of red roses, a sufficiency; beat into a proper mass; to be divided into pills, each containing gr. ij. of calomel.) Dose, one to two pills.

Uuguentum Calomelanos, PEREIRA. (Calomel, ʒj.; lard, ℥j.). A useful application in some chronic cutaneous diseases.

HYDRARGYRI IODIDUM VIRIDE, D. HYDRARGYRI IODIDUM, L. —*Green Iodide of Mercury. Iodide of Mercury. Sub-iodide of Mercury.*

PREPARATION.—"Pure mercury, ℥j.; pure iodine, ʒv.; rectified spirit, a sufficient quantity; rub the mercury and iodine in a porcelain mortar, adding a few drops of the spirit until metallic globules are no longer visible, and the whole assumes a yellowish-green colour. Dry the residue at a temperature not exceeding 100°, in a dark room, and preserve in a bottle impervious to light," D. "Mercury, ℥j.; iodine, ʒv.; rectified spirit, a sufficiency; rub together the mercury and iodine, spirit being gradually added until globules are no longer visible; then dry as quickly as possible with a gentle heat, the access of light being excluded, and preserve in well-stoppered dark glass vessels," L.

PROPERTIES.—This is a dull greenish-yellow powder, insoluble in both water and acohol; its composition is Hg^2 I. Exposed to light, or by the application of heat, it is readily resolved into metallic mercury and the red iodide; if rapidly heated, however, it may be fused and sublimed unchanged. It is insoluble in solution of chloride of sodium. Its specific gravity is 7·75.

THERAPEUTICAL EFFECTS.—The green is a much milder preparation than the red iodide of mercury; but in other respects its properties are nearly similar. It is peculiarly adapted as an alterative for the diseases of infancy and childhood, more particularly for the chronic cutaneous affections to which children are so liable, and especially for those seated on the scalp. It is also an excellent application in the form of ointment applied over chronic glandular enlargements.

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. iij. in pill; for children 1-6th of a grain to half a grain, combined with dried carbonate of soda and aromatic powder.

Unguentum Hydrargyri Iodidi, L. (Iodide of mercury, ℥j.; white wax, ℥ij.; lard, ℥vj.; to the wax and lard melted together, add the iodide, and rub well together.)

HYDRARGYRI IODO-CHLORIDUM. *Iodo-chloride of Mercury.*

PREPARATION.— "Take of pure iodine, 25 parts; spirit of wine, sp. gr. 827·7, 200 parts; calomel, 50 parts; dissolve the iodine in the spirit of wine; introduce the calomel into a matrass, apply the heat of a water bath, and gradually add the alcoholic solution of iodine, shaking the mixture from time to time; continue the heat until the saturation is complete, which may be known by the precipitated salt becoming of a brilliant scarlet colour; filter and wash the salt on the filtering paper with a little rectified spirit to free it from any adhering tincture of iodine; then dry it with blotting paper."—DANNECY.

PROPERTIES.—The salt thus obtained is perfectly homogeneous, in small cubical crystals of a brilliant scarlet colour; it is insoluble in water, but soluble in alcohol; it may be sublimed by heat without undergoing decomposition. This salt appears to be a true chemical compound analogous to the ammonio-chloride of mercury, the iodine taking the place of the ammonia in that preparation.

THERAPEUTICAL PROPERTIES.—This salt has now been used with much success for some years in France as a topical application in *acne rosacea*, and my own experience of its action in this troublesome affection is most favourable. Many of the French physicians combine its internal administration with its external employment; however in a few cases in which I administered it internally, so much gastric irritation resulted that I ceased to employ it so.

DOSE AND MODE OF ADMINISTRATION.—This preparation seems to be fully as active a poison as corrosive sublimate; the dose of it is from 1-16th to 1-12th of a grain in pill. For external use an ointment may be prepared by rubbing it up with prepared lard and glycerine in the proportion of gr. vij. of the salt, to ℥j. of lard, and fʒj. of glycerine. A small portion of this ointment may be smeared on the affected surface for 3 nights in succession and then omitted for 3 nights; and it may be repeated in this manner for several applications.

HYDRARGYRI NITRATIS UNGUENTUM, D. L. UNGUENTUM CITRINUM, D. E.—*Ointment of Nitrate of Mercury. Citrine Ointment.*

PREPARATION.—"Take of pure mercury, ℥j.; pure nitric acid, f℥j.; distilled water, f℥ss.; prepared lard, ℥iv.; olive oil, f℥viij. Mix the acid with the water and dissolve the mercury in the mixture, with the aid of a gentle heat. Melt the lard with the oil, and while the mixture is hot, add to it the solution of mercury, also hot; let the temperature of the mixture next be raised, so as to cause effervescence, and then, withdrawing the heat, stir the mixture with a porcelain spoon, until it concretes on cooling," D. "Mercury, ℥ij; nitric acid, f℥iv.; lard, ℔j.; olive oil, f℥viij.; first dissolve the mercury in the acid; then mix the solution, while hot, with the lard and oil melted together," L. "Nitric acid (Dens. 1380 to 1390), f℥ixss.; mercury, ℥iv,; axunge, ℥xv.; olive oil, f℥xxxviiiss.; dissolve the mercury in the acid with the aid of a gentle heat. Melt the axunge in the oil with the aid of a moderate heat in a vessel capable of holding six times the quantity; and while the mixture is hot, add the solution of mercury, also hot, and mix them thoroughly. If the mixture do not froth up, raise the heat a little till this take place. Keep the ointment in earthenware vessels, or in glass vessels secluded from the light," E.

PROPERTIES.—When recently prepared, this ointment is of a golden-yellow colour, and has an odour of nitrous acid. But it does not keep well, as no matter how carefully prepared, according to the directions of any of the British Pharmacopœias, it acquires after some time a grayish colour and becomes hard, when it is no longer fit for use. If an animal or fish oil, such as neat's-foot oil, trotter oil, or cod-liver oil, be substituted for the vegetable oil in the preparation of citrine ointment, the resulting ointment is of a dark brown, not golden, colour; but it keeps well, and is in my experience more efficacious as a remedial agent. An ointment so prepared is now generally kept in most of the shops in Dublin and dispensed under the name of brown citrine ointment *(Unguentum Citrinum fuscum).* Prepared with fresh butter it also keeps well, but its colour is very pale.

THERAPEUTICAL EFFECTS.—Citrine ointment is an excellent application in many forms of chronic ophthalmia, being especially useful when the eyelids are the seat of the disease; for this purpose it is generally diluted with an equal weight of lard. It is also a useful application, when diluted with from four to six times its weight of white wax ointment, to herpetic eruptions, and to chronic eczema or herpes of the scalp, provided no inflammatory symptoms be present. The following formula for a dilute citrine ointment is contained in the last edition of the London Pharmacopœia:—

Unguentum Hydrargyri Nitratis mitius, L. (Ointment of the nitrate of mercury, ℥j.; lard, ℥vij.; rub together: to be prepared fresh for use.)

HYDRARGYRI OXYDUM.—*Oxide of Mercury. Sub-oxide of Mercury. Black Oxide of Mercury.*

PREPARATION.—This oxide has been omitted from the last edition of the London Pharmacopœia, but the following process for its preparation was contained in that of 1836 : " Chloride of mercury, ℥j. ; lime water, cong. j. ; mix and frequently shake them. Set by, and when the oxide has subsided, pour off the liquor ; lastly, wash it in distilled water until nothing alkaline can be perceived, and dry it in the air, wrapped in bibulous paper."

PROPERTIES.—This is a black, or grayish-black, heavy powder, tasteless and odourless. Its density is 10·69 ; its composition, Hg^2O. Exposed to heat it is resolved into metallic mercury and the oxide, and this change takes place slowly at ordinary temperatures, under the action of strong light ; it then acquires a yellowish tinge. It is insoluble in water, and in the solutions of the alkalies, but it dissolves in nitric and acetic acids, combining with them to form salts.

ADULTERATIONS.—This preparation frequently contains the higher oxide, which may be detected by digesting for a short time with dilute hydrochloric acid, and straining ; the acid dissolves out the higher oxide only, which is thrown down in the form of a yellow precipitate on the addition of solution of potash. If it contains any fixed impurity, it will not be entirely dissipated by heat. Metallic mercury may be detected by the black oxide not being completely soluble in acetic acid.

THERAPEUTICAL EFFECTS.—Black oxide of mercury produces the usual effects of the mercurial preparations, but owing to its varying composition, and the difficulty of preserving it unchanged, is not employed internally. It is applied externally in the form of ointment (consisting of 1 part of oxide to 5 of lard) ; and it forms the active part of *black wash*, a most excellent application to chancres and other venereal sores, and one which is in very general use. Black oxide of mercury is also employed for mercurial fumigations.

Lotio nigra. Black wash. (Calomel, ʒij. ; lime water, f℥xij. ; mix.) This wash must be well shaken, so as to suspend the black oxide every time it is used. It is employed with benefit in most foul and indolent sores, although not of a venereal origin.

HYDRARGYRI OXYDUM RUBRUM.—*Red oxide of Mercury. Binoxide of Mercury. Oxide of Mercury.*

PREPARATION.—Bichloride of mercury, ℥iv. ; solution of potash, f℥xxviij. ; distilled water, Ovj. ; dissolve the bichloride in the water ; strain and add the solution of potash. The liquor being poured off, wash in distilled water the powder thrown down, until nothing alkaline can be perceived, and dry it with a gentle heat. *London Pharmacopœia*, 1836.

PHYSICAL PROPERTIES.—This oxide is met with in the form of an orange-red powder, odourless, with a disagreeable metallic taste. Specific gravity, 11·074.

CHEMICAL PROPERTIES.—Its composition is $Hg\,O$, being a protoxide. At a heat below redness it is entirely resolved into metallic mercury and oxygen, and is therefore frequently employed in chemistry for procuring that gas. It is very slightly soluble in water, the solution acting feebly alkaline on vegetable colours.

ADULTERATIONS.—This preparation seldom contains any impurity. The best test of its freedom from adulteration is its complete solubility in hydrochloric acid.

THERAPEUTICAL EFFECTS.—Red oxide of mercury is not employed internally in medicine in the present day, and consequently has been omitted from the last editions of the Dublin and London Pharmacopœias. It was formerly used to produce salivation. The dose is from gr. $\frac{1}{4}$th to gr. iss. in pill. It may be applied externally for the same purposes as the nitric oxide (see page 166), than which it is less caustic. It forms the active part of *yellow wash*, which is preferred by some to *black wash* as an application for venereal sores.

Lotio flava. Yellow wash. (Corrosive sublimate, ℈j.; lime water, f℥xij.; mix.)

HYDRARGYRI PRECIPITATUM ALBUM, E. HYDRARGYRI AMMONIO-CHLORIDUM, D. L.—*White precipitate. Ammonio-chloride of Mercury. White precipitate of Mercury.*

PREPARATION.—" Take of corrosive sublimate, ℥j.; solution of ammonia, fʒix.; distilled water, Oj. Dissolve the corrosive sublimate in the water, with the aid of a gentle heat, pour the ammonia into the solution, and, having stirred the mixture well, collect the precipitate on a filter, and wash it with warm distilled water, until the liquid which passes through ceases to give a precipitate when dropped into an acid solution of nitrate of silver. Lastly, dry the product at a temperature not exceeding 212°," D. " Bichloride of mercury, ℥vj.; distilled water, Ovj.; solution of ammonia, f℥viij.; dissolve the bichloride in the water with the aid of heat; to this, when cold, add the ammonia, stirring frequently; wash the powder thrown down until it is free from taste, then dry it," L. " Corrosive sublimate, ℥vj.; distilled water, Ovj.; aqua ammoniæ, f℥viij.; dissolve the corrosive sublimate with the aid of heat in the distilled water; and when the solution is cold, add the aqua ammoniæ; stir the whole well; collect the powder on a calico filter, and wash it thoroughly with cold water," E.

PHYSICAL PROPERTIES.—This preparation is in the form of a bulky snow-white powder, odourless but having a styptic metallic taste.

CHEMICAL PROPERTIES.—It is a true chloro-amidide of mercury, its formula being $Hg\,Cl + Hg\,Ad$, (Kane). It is insoluble in cold water; by boiling water it is decomposed into sal-ammoniac which is dissolved, and into a heavy yellow powder (*chloro-amidide* and *binoxide of mercury*, Kane.) which is insoluble in water. White precipitate may be distinguished from calomel by solution of ammonia, which does not alter the former, but blackens the latter. When heated suddenly, it is completely dissipated.

ADULTERATIONS.—I have never met with any impurity in this preparation. The London College has given the following tests for its purity :—"Totally evaporated by heat. It is entirely dissolved by hydrochloric acid without effervescence. When heated with solution of potash it emits ammonia and becomes yellow."

THERAPEUTICAL EFFECTS.—White precipitate is not used as an internal remedy. Externally in the form of ointment it is an excellent application in many forms of chronic cutaneous diseases, as in herpetic eruptions, sycosis menti, impetigo, acne of the face, &c,

Unguentum Hydrargyri Ammonio-chloridi, L. *Unguentum Precipitati albi*, E. ("Ammonio-chloride of mercury, ʒij. ; lard, ℥iij. ; add the ammonio-chloride to the lard and rub together," L. "White precipitate, ʒij. ; axunge, ℥iij. ; melt the axunge, add the white precipitate, and stir briskly as the ointment concretes in cooling," E.) This ointment has been omitted from the last edition of the Dublin Pharmacopœia. It may be diluted by the addition of from one to three parts of lard or white wax ointment.

HYDRARGYRI SULPHAS, D.—*Sulphate of Mercury. Persulphate of Mercury.*

PREPARATION.—Take of quicksilver of commerce, ten ounces ; oil of vitriol of commerce, six fluid ounces. Place the quicksilver and oil of vitriol in a porcelain capsule, and apply heat until effervescence ceases, and nothing remains but a white and dry crystalline salt.

This preparation, the composition of which is $Hg\,O, SO^3$, has not been used in medicine. It is introduced into the pharmacopœia as being employed in the preparation of *calomel*, and of *corrosive sublimate.*

HYDRARGYRI SULPHURETUM RUBRUM. HYDRARGYRI BISULPHURETUM, L. CINNABARIS, E.—*Red Sulphuret of Mercury. Cinnabar.* This compound of mercury has been omitted from the last edition of the Dublin Pharmacopœia.

PREPARATION.—Mercury, lbij. ; sulphur, ℥v. ; mix the mercury with the sulphur melted, and as soon as the mass swells up, remove the vessel from the fire ; and cover the vessel closely to prevent the mass from taking fire. Then reduce the material to powder as soon as it is cold, and sublime it ; L. E.

PHYSICAL PROPERTIES.—This is the most common ore of mercury. When prepared for medical use, it occurs in the form of dark red crystalline masses, which when reduced to fine powder are of a brilliant rich red colour, and then constitute the pigment *vermilion.* It is without odour or taste, and is insoluble in water, alcohol, or ether. Its specific gravity is 8·1.

CHEMICAL PROPERTIES.—Cinnabar is composed of 1 equivalent of mercury and 1 of sulphur, its formula being Hg, S. It is permanent in the air ; by exposure to heat it is at first blackened, and then totally dissipated. It is inflammable, burning with a blue flame, and a sulphurous-acid odour.

ADULTERATIONS.—Cinnabar is very liable to be adulterated with red lead, with realgar (*sulphuret of arsenicum*), with red oxide of iron, and with earthy impurities. When heat is applied, oxide of iron or any other earthy matter will be left; if the impurity be red-lead, metallic globules of lead will remain. Sulphuret of arsenicum may be detected by the usual tests for the preparations of that metal (see page 163). In the last edition of the London Pharmacopœia it is stated to be: "Sublimed by heat; potash being added, the mercury runs into globules."

THERAPEUTICAL EFFECTS.—Cinnabar is not used as an internal remedy. It is the preparation of the metal most generally employed for mercurial fumigations; for which purpose it is thrown on a plate of heated iron, and the fumes thus evolved, either inhaled to produce salivation, or directed on ulcerated parts. Mercurial fumigations, however, may be conducted in a much more easy manner, as proposed by the late Mr. Colles, "by directing the intended dose of cinnabar or black oxide of mercury to be mixed with melted wax, and with a cotton wick moulded into a small candle; this may be stuck on a common plate, and then burned under a curved glass funnel, which is to be raised about an inch from the plate." Fumigations with the *mercurial candle* may be conveniently directed on any part of the body. They were highly recommended by Mr. Colles for those obstinate ulcerations which occur about the roots of the nails.

INDIGO.—*Indigo.* A peculiar colouring matter obtained from the leaves of several species of the genus *Indigofera*, especially *tinctoria*, *argentea*, *anil*, and *disperma*; which are natives of India, and belong to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria.*

PREPARATION.—The plants are cut down just before the flowers appear, placed in large vats and covered with water; in which they are left for about 12 hours, until fermentation takes place, which process is sometimes promoted by using lime water. The liquor, which has acquired a yellow colour, is drawn off into another vat, beaten with rods, and constantly agitated until it becomes blue, and the indigo precipitates. It is then drained on calico, pressed and dried.

PHYSICAL PROPERTIES.—Indigo as met with in commerce, is of a deep blue colour shaded with violet, smooth and hard; when rubbed acquiring a metallic appearance. It is inodorous, but has a somewhat metallic taste.

CHEMICAL PROPERTIES.—Indigo is a compound substance consisting of a glutinous matter, indigo blue (*indigotin*), indigo brown, and indigo red. The formula of indigo blue is $C^{16} H^{5} N O^{2}$. It is insoluble in water, in cold alcohol and in ether; but is partially soluble in boiling alcohol.

THERAPEUTICAL EFFECTS.—Some years ago indigo was employed on the continent in the treatment of nervous and spasmodic affections, and it was stated with great success. The diseases in which it was found to be peculiarly beneficial were idiopathic epilepsy, chorea, hysteria, and convulsions. It was also administered in these countries in epilepsy and aggravated hysteria with partial beneficial results, but they were so uncertain that it has now fallen into disuse.

DOSE AND MODE OF ADMINISTRATION.—It should be given in as large doses as the stomach will bear, but as it acts with much difference on different individuals, the dose ought not at first to exceed five grains three times a day, but should be rapidly increased until ℥j. or even more is taken daily. It is best administered in the form of electuary, made with one part of indigo and two of syrup or honey, with which aromatics are in general combined.

Compound Pills of Indigo, (Indigo, gr. xv.; opium, powdered, gr. ij.; extract of valerian; and extract of cinchona, of each, gr. xxij.; mix and divide into 24 pills.) Dose, 4 daily. This combination has been highly praised by M. Michel, in idiopathic epilepsy; he directs for the patient at the same time a wine-glassful of infusion of arnica morning and evening.

IODINIUM, D. L. IODINEUM, E.—*Iodine. Crystalline Iodine*, L.

PREPARATION.—Iodine is an article of the Materia Medica in the three British Pharmacopœias. It is procured by the manufacturers on the large scale from the ashes obtained by burning various species of sea-weed. These ashes, technically called *kelp*, are lixiviated with water, to which they yield about half their weight of salts. The mother liquor is poured off from these salts which are deposited by evaporation and crystallization; it is then treated with a mixture of two parts and a-half of sulphate of iron, and one part of sulphate of copper, so as to precipitate the subiodide of copper; this is heated with binoxide of manganese and sulphuric acid when the iodine is disengaged in violet vapours, which condense into black crystals as they cool. Iodine as it occurs in commerce being however seldom sufficiently pure for medical purposes, it is ordered by the Dublin and Edinburgh Colleges to be purified as follows, when it constitutes *Iodinium purum*, D. E.—"Take of iodine of commerce, any convenient quantity. Introduce it into a deep porcelain capsule of a circular shape, and, having covered this as accurately as possible with a glass matrass filled with cold water, apply to the capsule a water heat for the space of twenty minutes, and then, withdrawing the heat, permit the capsule to cool. Should the sublimate attach to the bottom of the matrass include acicular prisms of white colour and pungent odour, let it be scraped off with a glass rod, and rejected. The matrass being now returned to its previous position, a gentle and steady heat (that of a gas-lamp answers well) is to be applied, so as to sublime the entire of the iodine. Upon now lifting off the matrass, the purified product will be found attached to its bottom. When separated, it should be immediately enclosed in a bottle furnished with an accurately ground stopper," D. "As met with in commerce, iodine is generally adulterated with variable proportions of water, and being consequently unfit for making pharmaceutic preparations of fixed and uniform strength, it must be dried by being placed in a shallow basin of earthenware in a small confined space of air with ten or twelve times its weight of fresh burnt lime, till it scarcely adheres to the inside of a dry bottle," E.

PHYSICAL PROPERTIES.—Iodine is generally met with in the form of small crystalline scales often accreted into masses, of a bluish-black colour with a metallic lustre. It has a strong disagreeable odour resembling that of chlorine, and a very acrid taste. From a solution in liquid hydriodic acid, it may be obtained in tolerably large crystals, which are oblique octohedrons with a rhombic base. Its density is 4·948.

CHEMICAL PROPERTIES.—Iodine is an elementary body existing in combination in both kingdoms of nature; its equivalent is 127·1. It evaporates slowly at the usual temperature if exposed to the air, and more rapidly if moistened; fuses at 225° and boils at 347°. Exposed to an increased temperature it is volatilized in the form of a beautiful violet-coloured vapour from whence it has derived its name, (Ιώδης, violet.) Iodine requires 7000 parts of pure water for its solution, to which it imparts a brownish colour; is much more soluble in alcohol, and very soluble in ether. The presence of tannin in water renders iodine more soluble in that liquid, which property may be taken advantage of in prescribing it in medicine, the addition of any astringent tincture or syrup increasing its solubility. Solutions of the iodides in water dissolve much iodine. The best characteristic of iodine is its action on starch, (see page 230.)

ADULTERATIONS.—Iodine is frequently adulterated with fixed substances, such as charcoal, plumbago, black oxide of manganese, &c., all of which may be readily detected by their not being sublimed on the application of heat, or by their being left as an insoluble residue when iodine is treated with alcohol. Attention has been also directed by Professor Christison to an adulteration of much consequence, that with water, of which it frequently contains from 15 to 20 per cent: that is to say, ℥j. of iodine may contain ʒiss. or even more of water. It may be readily detected by pressing a specimen between folds of filtering paper, or by shaking it in a very dry bottle. If greater accuracy be required, the test of the *Edinburgh Pharmacopœia* may be applied:—"Gr. xxxix. with gr. ix. of quicklime, and f℥iij. of water when heated short of ebullition, slowly form a perfect solution, which is yellowish or brownish if the iodine be pure, but colourless if there be above two per cent of water or other impurity." The following are the characteristics and tests for iodine in the last edition of the London Pharmacopœia:—"Black, with metallic lustre, and an odour of chlorine; on the application of heat it first becomes liquid and then evaporates in violet coloured vapours; soluble in rectified spirit; this solution colours starch blue; gr. xxxix. of iodine dissolved in f℥iij. of water, and gr. ix. of lime added, on the application of heat the solution becomes of a yellow or brownish colour."

THERAPEUTICAL EFFECTS.—Introduced into the stomach, iodine exerts a local irritant action on that viscus, causing nausea and vomiting; in large doses, it produces the effects of an irritant poison; but in many instances, even when taken in enormous quantities, it has caused scarcely any effect if dissolved in a large quantity of fluid. In slight or medicinal doses, iodine acts as a special stimulant to the glandular system, generally affecting at the same time the organs of secretion, stimulating them to increased action. Under the continued use of small doses of this medicine, the removal or palliation of disease will sometimes take place without any perceptible action on the system generally ; in other instances, much emaciation and derangement of the digestive functions will be produced; while the very reverse effect, namely, deposition of fat and increased appetite, is very frequently observed, as the consequence of a lengthened administration of iodine. A curious statement, the truth of which I am inclined to doubt, for I cannot discover any authentic record of its having been witnessed in this country, was put forward some years ago on the continent : that absorption of the mammæ in females, and wasting of the testicles in males have been produced by the continued administration of iodine.

A remarkable train of symptoms, characterizing a peculiar disordered state of the system which has been named *iodism*, occasionally arises when the use of iodine in frequent small doses has been persisted in for a long time. These symptoms are nausea, headache, general languor and loss of appetite, followed by vomiting and purging, extreme depression, frequent small pulse, great weakness, fainting, and dry cough occasionally attended with inflammation of the mucous membrane lining the air passages, and terminating in death, if the use of the iodine be not abandoned in time. Iodism is, however, in the present day, rarely witnessed, and when it does occur, is easily checked by suspending the use of the medicine.

Iodine is a most valuable remedial agent in the treatment of glandular enlargements, and in scrofulous affections; but its employment is contra-indicated when acute inflammation is present. In bronchocele, it has proved more successful than any other remedy ; indeed there are few cases, unless where the thyroid gland has become completely indurated, which will withstand the use of iodine when continued steadily for six weeks or two months ; and even cases where the gland is much indurated are often remarkably relieved. In the innumerable varieties of scrofulous affections, this remedy is most extensively employed and with decided advantage. It is found particularly beneficial in glandular swellings, tumours, abscesses, ulcers, ophthalmia, and diseases of the bones occurring in scrofulous constitutions. Iodine, has also proved eminently successful in chronic enlargements of the abdominal viscera, particularly of the liver, spleen, and ovaries. There are no remedies which in my experience prove so successful in the treatment of cutaneous diseases, especially those of a chronic character, as iodine and its preparations; but to prove beneficial, their administration must be persisted in for some time, until in fact the system is manifestly brought under their influence. In fine, iodine has been proposed as a remedy in phthisis, in amenorrhœa, in leucorrhœa, in gout, in palsy, in chorea, in ascites, &c ; but in all these cases its success is very equivocal. The inhalation of the vapour of iodine was at one time very much used in the treatment of phthisis and of chronic bronchitis, but general experience has proved its inutility. An injection composed of one part of tincture of iodine and three parts of water is used after tapping, for the radical cure of hydrocele. Topically, iodine is employed in the form of tincture, of ointment, or of a solution in water, as a local stimulant in many forms of chronic cutaneous diseases, to enlarged glands, in chronic swellings of the joints, to inflamed bursæ, to buboes, over large chronic abscesses, in erysipelas, &c. ; but its external employment requires caution, as if applied in too concentrated a form, it is apt to excite severe local inflammation.

DOSE AND MODE OF ADMINISTRATION.—Iodine is not administered in substance; and as it is usually given in combination with iodide of potassium, there are no simple preparations of it contained in the Dublin or London Pharmacopœias; a tincture is officinal in that of Edinburgh.

Tinctura Iodinei, E. (Iodine, ℥iiss. ; rectified spirit, Oij.; dissolve the iodine in the spirit with the aid of a gentle heat and agitation; keep the tincture in well-closed bottles.) One fluiddrachm contains gr. iij.$\frac{3}{4}$ of iodine. Dose, min. v. to min. xx. two or three times a-day; it may be given in f℥ss. of water and sweetened with simple syrup.

Solution of Iodine. LUGOL. (Dissolve, gr. j., gr. ij., or gr iij. of iodine in f℥viij. of distilled water.) These three solutions are of a convenient and useful strength for the local employment of iodine in rebellious ulcerations, in lupus and in scrofulous diseases.

INCOMPATIBLES.—Ammonia, sulphur, phosphorus, metals and their salts, hydrosulphates, sulphuric, nitric, and hydrocyanic acids, and the vegetable alkaloids.

In poisoning with iodine, emetics should be administered and their operation aided by the use of demulcent and amylaceous drinks, as starch, flour, &c., diffused through tepid water or milk.

MORRHUÆ OLEUM, D. L.—*The oil obtained from the liver of Morrhua vulgaris, the common Cod*, D. *An oil prepared from the liver of Gadus morrhua*, L.

PREPARATION.—Although this oil is directed by the Dublin and London Colleges to be obtained from the liver of the common Cod, it is also procured from other allied species, such as the Ling—*Gadus lota*, the Dorse—*Gadus callarias*, the Torsk—*Gadus brosma*, &c. Much of what is met with is imported from Newfoundland, and from the North of Europe, where it is prepared by exposing the livers to the sun to putrefy, when the oil runs from them, and is received in vessels placed underneath: thus prepared, according to M. de Jongh, it constitutes the *pale* oil of commerce; by boiling the residuum, the *brown* oil is procured; and the *light brown* oil is the *impaired* pale oil, either from the livers having lain too long, or in consequence of the pale oil having been kept too long in warehouses or exposed to damp. What is drawn in this country is procured by simply boiling the fresh livers (exposing them to a temperature not higher than 192° F., DONOVAN) expressing and filtering.

PHYSICAL PROPERTIES.—As generally met with, cod-liver oil is transparent, varying in colour from pale straw yellow to rich golden brown, with the odour of fresh boiled cod, and a greasy, bland taste, leaving a disagreeable impression on the palate. Some specimens have a very rancid odour, and an exceedingly nauseous taste. Three varieties of different colours, as above described, are met with in the shops.

CHEMICAL PROPERTIES.—According to the analysis of M. de Jongh, it contains three peculiar principles, one of which has been named *gaduine*, oleic and margaric acids, glycerine, traces of butyric, acetic, fellic and choleïc acids, salts of soda, lime, and magnesia, some other unimportant substances, phosphorus, phosphoric acid, iodine, and chlorine, with a trace of bromine. The *pale* oil contains the greatest quantity of iodine, chlorine, bromine, phosphorus, and salts ; while the *brown* oil is richest in the component parts of the bile, butyric, and acetic acids. It appears then from this analysis, that the medical properties of the oil are due to the presence of the powerful elements, iodine, chlorine, phosphorus, and bromine, naturally combined with other constituents, probably of less importance, in an *organic oil*.

ADULTERATIONS.—When cod-liver oil was first used extensively in medicine, it was not only very much adulterated, but other oils, both animal and vegetable, were substituted for it, in consequence of the demand exceeding the supply. Now, however, it is very generally met with of excellent quality, and the goodness of a specimen may be readily judged of by its physical properties.

THERAPEUTICAL EFFECTS.—Professor Bennett of Edinburgh was unquestionably the first British physician of modern times to direct the especial notice of the profession to this most valuable therapeutic agent, for until the publication of his book in 1841, cod-liver oil, although at one time much employed in England, had fallen completely into disuse. It is as a remedy for phthisis that this oil has proved so important an edition to the Materia Medica, and from the vast experience of its efficacy which has been accumulated within the last fifteen years, I do not think that I am asserting too much for it when I state that its use has to a great extent removed tubercular consumption from the list of incurable diseases. It is employed with benefit in all stages of the disease, nor do any local symptoms contra-indicate its use; should any of these, such as intercurrent pneumonia or pleuritis, diarrhœa, sweating, vomiting, &c., be present, they should be treated by the remedies applicable to each, but in the mean time the administration of the oil need not be suspended. It must be therefore remembered that it is as an adjunct to other treatment cod-liver oil proves so valuable a remedy in phthisis; and in the hands of those who look upon it as a *sole* remedy in this disease, it can only be productive of disappointment. As the remediate efficacy of cod-liver oil in consumption depends probably to a great extent on the readiness with which an animal oil is assimilated in the human economy, it is especially requisite in order to obtain the full benefit derivable from its use, that the patient should breathe a healthy atmosphere, and as far as practicable take exercise in the open air. I am far, however, from believing that the remedial powers of this medicine are solely due to the property here referred to, nor do I think that, as some physicians have suggested, similar effects are produced by other fatty matters, whether alone or combined artificially with iodine, bromine, &c. Besides phthisis, cod-liver oil has been employed in a great number of diseases, but it appears to be particularly useful in chronic rheumatism, in scrofulous abscesses and caries of the bones, in arthritis, in rickets, in strumous ophthalmia, and in obstinate cutaneous affections. It is productive of very great service in the treatment of many forms of neuralgia; and I have employed it in some cases of diabetes with much benefit. In most of these diseases, its external application is beneficially combined with its internal use; and to prove successful, its administration must be persevered in for a very long period, in some instances even for years.

DOSE AND MODE OF ADMINISTRATION.—Cod-liver oil should in all cases be given at first in small doses: for adults a dessert spoonful, and for young persons a tea spoonful three times a day; and this quantity should be gradually increased until a table spoonful is taken three times daily. I have not seen any advantage in giving a larger quantity than this, but some physicians prescribe so much as a pint of the oil in the 24 hours. It is most readily taken floating on a glass of water or boiled milk; to the former some aromatic tincture, as of orange or lemon-peel, may be added, or it may be given made into an emulsion with a solution of potash and some aromatic water. But no matter how it is attempted to be disguised, it creates in some persons an intolerable disgust, leaving a most disagreeable and permanent impression on the mouth and fauces, which, together with the length of time its administration must be persisted in, prevented it for a long period from coming into general use. The late Dr. Ure suggested the adoption of the livers of the cod-fish as a diet for patients who are recommended to take the oil; and in order to prevent the dissipation of the oil during the cooking, the livers should be suddenly immersed in boiling water, to which sufficient salt has been added to raise the boiling point to 220° F. He states that he had used this diet himself without inconvenience, employing mashed potato as a vehicle for the oil which exudes on cutting the liver. Dr. Copland recommends the liver to be used as an article of diet, prepared in the following way:—The stomach of the fish is well washed, two parts filled with the fresh liver, and firmly tied at each end so as not to allow any of the oil to escape whilst being boiled. This is eaten *quite warm*, with a little salt and spice, in which state he says that it is very palatable. In all cases the oil sits most easily on the stomach when it is taken during or immediately after meals, being thus digested with the food.

The oil obtained from the liver of the Skate, *Raia clavata*, has been proposed as a substitute for cod-liver oil; it is stated to be less disagreeable to the taste, and also more efficacious in its therapeutical effects.

NUX-VOMICA, D. L. E.—*Seeds of Strychnos nux-vomica.* A native of the Indian Continent, of the Coasts of Coromandel, and of the Island of Ceylon; belonging to the Natural family *Apocynaceæ* (*Loginaceæ*, Lindley,) and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—A moderate sized tree; Trunk, thick, with a grayish mottled bark, covered in parts with a reddish-brown efflorescence; Branches, opposite, long; Leaves, oval, shining, leathery, 5-nerved; Flowers in small terminal corymbs, greenish-white; Fruit, ovoid, orange-coloured, one-celled, pulpy, about the size of a small apple, containing many seeds.

PHYSICAL PROPERTIES.—Strychnos seeds, *nux-vomica*, are about an inch in diameter and two lines thick, round, nearly flat, umbilicated and slightly convex on one side, concave on the other. Externally they are of an ash-grey colour, satiny, covered with short yellowish hairs; internally they consist of a horny, whitish or yellowish albumen, which separates into two parts, and contains, in a small cavity in the circumference, the embryo with its two acuminate cotyledons. Nux-vomica seeds are with difficulty reduced to powder; they are inodorous, but have an acrid, intensely bitter taste. The bark has been occasionally met with in British commerce under the name of False Angustura bark (see Cusparia.)

CHEMICAL PROPERTIES.—Nux-vomica consists of two peculiar alkaloids, *strychnia* and *brucia*, in combination with a peculiar acid, *igasuric* or *strychnic acid*, with other unimportant matters. More recently M. Denoi has obtained from it a third alkaloid, which he proposes to term *igasuria;* the properties of which are nearly analogous to those of brucia. Its medical properties depend on the alkaloids, of which strychnia is the more active, and is officinal in the three British Pharmacopœias. It is an article of the Materia Medica in the last edition of the London Pharmacopœia, and the following processes are given for its preparation in the two other British Pharmacopœias;—

Dublin.—" Take of nux-vomica, in powder, ℔j.; water, cong. iss.; oil of vitriol of commerce, f℥ss.; slaked lime, ℥j.; rectified spirit, Oij.; dilute sulphuric acid; solution of ammonia, of each, a sufficient quantity; prepared animal charcoal, ℥ss. Macerate the nux-vomica for twenty-four hours with half a gallon of the water, acidulated with two drachms of the acid, and, having boiled for half an hour, decant. Boil the residuum with a second half-gallon of the water, acidulated with one drachm of the acid; decant, and repeat this process with the remaining water and acid, the undissolved matter being finally submitted to strong expression. The decanted and expressed liquors having been passed through a filter, and then evaporated to the consistence of a syrup, let this be boiled with the rectified spirit for twenty minutes, the lime being added in successive portions during the ebullition, until the solution becomes decidedly alkaline. Filter through paper, and having drawn off by distillation the whole of the spirit, let the residuum be dissolved in the dilute sulphuric acid, and to the resulting liquid, after having been cleared by filtration, add the solution of ammonia in slight excess, and let the precipitate which forms be collected upon a paper filter, dried, and then dissolved in a minimum of boiling rectified spirit. Into this solution introduce the animal charcoal, digest for twenty minutes, then filter, and allow the residual liquor to cool, when the strychnia will separate in crystals." *Edinburgh.*—"Nux-vomica, ℔j.; quicklime, ℥iss.; rectified spirit, q. s.; subject the nux-vomica for two hours to the vapour of steam, chop or slice it, dry it thoroughly in the vapour-bath or hot-air press, and immediately grind it in a coffee-mill. Macerate it for twelve hours in Oij. of water and boil it; strain through linen or calico, and squeeze the residuum; repeat the maceration and decoction twice with Oiss. of water. Concentrate the decoctions to the consistence of thin syrup; add the lime in the form of milk of lime; dry the precipitate in the vapour-bath, pulverize it, and boil it with successive portions of rectified spirit, till the spirit ceases to acquire a bitter taste. Distil off the spirit till the residuum be sufficiently concentrated to crystallize on cooling. Purify the crystals by repeated crystallizations."

Strychnia crystallizes in colourless minute octohedrons, but as met with in commerce it is usually in the form of a grayish white granular powder; it is odourless, but has an intensely bitter taste. It is soluble in 2500 parts of boiling, and in 6667 parts of cold water, but this last solution, if still further diluted with 100 times its weight of water, tastes strongly bitter. It dissolves in diluted alcohol, but is insoluble in absolute alcohol and in ether. It is permanent in the air, acts as an alkali on vegetable colours, and combines with acids to form salts. The composition of strychnia is $C^{44} H^{23} N^{2} O^{4}$, (Regnault.)

Brucia is not employed in medicine, and therefore need not be particularly described here. In most of its properties it resembles strychnia, but it is soluble in 500 parts of boiling water, and produces a rich red colour with nitric acid, which change does not occur with perfectly pure strychnia. *Igasuria* is still more soluble in water than brucia, requiring only 200 parts of boiling water for its solution.

Powdered nux-vomica is of a grayish-yellow colour; it yields its active principles to water and diluted alcohol, but not to ether.

ADULTERATIONS.—According to Christison, powdered nux-vomica is frequently adulterated with common salt, but I have never met with this impurity; it may be readily discovered, by treating the powder with cold water, filtering, evaporating and crystallizing. Strychnia is very liable to adulteration, and as met with in commerce is never free from brucia and colouring matter, and consequently among the characteristics of the alkaloid, the Edinburgh College has stated, that it is strongly reddened by nitric acid, which, as above remarked, does not occur unless brucia be present: that it is sufficiently pure for medical purposes, may be known by the following test of the same college:—"A solution of gr. x. in f℥iv. of water by means of fʒj. of pyroligneous acid, when decomposed by f℥j. of concentrated solution of carbonate of soda, yields on brisk agitation an adhesive mass, weighing when dry gr. x. and entirely soluble in solution of oxalic acid." The following are the characteristics and tests for strychnia given in the last edition of the London Pharmacopœia:—"Soluble in hot rectified spirit; it melts when heated, and if the heat be increased is consumed away; taste, very bitter."

THERAPEUTICAL EFFECTS.—In very small doses, nux vomica appears to act as a tonic; but in somewhat larger doses it operates as a special stimulant to the medulla oblongata and spinal marrow, without affecting the sensorium. Its effects are principally exerted on the nerves of motion, as indicated by the spasmodic twitchings of the voluntary muscles, which, when the dose is large or the use of small doses has been continued for some time, amount to violent tetanic spasms. It is a very active poison, so small a dose as ℨss. of the powder, or gr. j. of pure strychnia having proved fatal; the symptoms which precede death are simply those of tetanus and asphyxia. As a medical agent, the principal use of nux-vomica is in the treatment of chronic paralytic affections; but as it does not prove equally serviceable in all forms of paralysis, and in some proves absolutely injurious, is will be necessary to state the circumstances which demand or contra-indicate its use.

When paralysis is the consequence of inflammatory action in the brain or spinal marrow, or is produced by what is the most common cause, the pressure of effused blood on the nervous centres, nux-vomica always proves injurious, unless the inflammatory action had been previously subdued, or a length of time had elapsed since the effusion had taken place. It proves beneficial more frequently in general than in partial paralysis, and in paraplegia than in hemiplegia. It is, however, often of service in palsy of certain organs, as in incontinence of urine depending on paralysis of the muscles of the bladder, and, when applied by the endermic method, in some forms of amaurosis. Nux vomica and its alkaloid have been also employed in the treatment of other affections of the nervous system, as in chorea, epilepsy, and nervous tremors; in the latter of which it appears to have proved of most service. I have used extract of nux-vomica with much advantage as an addition to purgatives in constipation depending on want of tone in the muscular coat of the larger intestines, one of the most frequent causes of this state in females, and one which is distinctly characterized by the great secretion of flatus, and colicky pains which accompany it; for a nearly similar reason it is a most useful remedy in the constipation of painter's colic. In epidemic dysentery, its beneficial effects have been highly spoken of in Germany and in Sweden; and I have derived much benefit from the administration of the extract in chronic diarrhœa; especially that form of the disease which may be termed *nervous* diarrhœa. It has been also found successful occasionally in the treatment of amenorrhœa, of hypochondriasis, of dyspepsia, of gastrodynia, of prolapsus ani, of impotence, of prurigo, &c. It is remarkable that when administered in paralysis, the effects of nux vomica on the muscular system are principally, though not, as was at one time imagined, entirely, confined to the paralysed parts.

DOSE AND MODE OF ADMINISTRATION.—Nux-vomica may be administered in powder in doses of gr. v. gradually increased to gr. xx.

Extractum Nucis Vomicæ, L. E. ("Nux-vomica, ℥viij.; rectified spirit, Oiij.; expose the nux-vomica to steam until it is softened; afterwards bruise it, cut into thin slices, dry, and macerate for seven days in two pints of spirit; express the tincture and filter: again macerate what remains in the rest of the spirit for three days; then again express and filter: distil off the greater part of the spirit from the mixed tinctures and evaporate to a proper consistence," L. "Take of nux-vomica, any convenient quantity; expose it in a proper vessel to steam until it is completely softened; slice it, dry it thoroughly, and grind it in a coffee-mill; exhaust the powder either by percolating it with rectified spirit, or by boiling it with repeated portions of rectified spirit, till the spirit comes off free from bitterness. Distil off the greater part of the spirit; and evaporate what remains to a proper consistence in the vapour-bath," E.) Dose, gr. ss. gradually increased to gr. iij. in the form of pill. When carefully prepared, this extract is an excellent preparation, and might be used instead of strychnia, which is very difficult to prepare, and in general is much adulterated. It has been omitted from the last edition of the Dublin Pharmacopœia.

Tinctura Nucis Vomicæ, (Nux-vomica, rasped, ℥ij.; rectified spirit, f℥viij.; macerate for seven days and filter.) This tincture might be readily prepared by percolation; but the above is the formula of the Dublin Pharmacopœia of 1826; it has been omitted in the last edition. In consequence of its intense bitterness, it was not much used internally; it is however a most excellent remedy in the treatment of nervous tremors and of other nervous symptoms which are so often dependent on dyspepsia and hypochondriasis. Externally it may be employed in the form of embrocation to paralysed parts. Dose, min. x. to min. xxx.

Strychnia, D. L. E. Dose, 1-12th of a grain gradually and slowly increased until its effects are produced; always diminishing the dose at first, when a different sample of the drug is employed. It is usually given made into pill with crumb of bread, or with conserve of roses: but as it is difficult to divide it with sufficient accuracy into pills, a preferable method is to dissolve a grain in ~~f℥ij.~~ [illegible] of rectified spirit, with the aid of min. ij. of sulphuric, hydrochloric, or acetic acid; so that every min. x. of this solution will contain 1-12th of a grain of the salt of strychnia. When applied by the *endermic* method, gr. ss. of the alkaloid or any of its salts, may be sprinkled over the surface previously denuded of the cuticle, or the solution described above may be used. The following formula for preparing the hydro-chlorate is given in the last Dublin Pharmacopœia:—

Murias Strychniæ, D. (Take of strychnia, ℥j.; dilute muriatic acid, f℥j.; or a sufficient quantity; distilled water, f℥iiss. Pour the acid upon the strychnia, and, adding the water, apply heat until a perfect solution is obtained. Let this cool, and let the crystals which form be dried upon bibulous paper. By evaporating the residual liquid to one-third of its bulk, and then allowing it to cool, an additional quantity of the salt will be obtained.) The dose is the same as of the pure alkaloid. I prefer much the sulphate to this salt.

No matter how administered, great attention is requisite during the use of nux-vomica or its alkaloid, in consequence of their great activity as poisons, our ignorance of any chemical antidote, and from the fact of some individuals being much more susceptible of their effects than others.

PEPSINA.—*Pepsine. Medicinal pepsine.* The active principle of the gastric juice in animals. Pepsine combined with starch.

PREPARATION.—The following is the process proposed by M. Boudault for the preparation of this substance. The rennet bags of sheep are reversed and washed under a stream of water; the mucous membrane is then scraped off with a knife, reduced to a pulpy state and digested for 12 hours in distilled water. The solution thus obtained is filtered and neutral acetate of lead added so as to throw down the peptate of lead, which is then decomposed by a stream of sulphuretted hydrogen. The sulphuret of lead is separated by filtration and the resulting solution acidulated by the addition of lactic acid. It is then evaporated at a temperature not exceeding 100° F. to a syrupy consistence and dried starch added in such proportion that one part of the resulting compound will have the power of dissolving four parts of fibrin at a temperature of 98° F.

PROPERTIES.—*Medicinal pepsine* thus obtained is in the form of a fine light powder of a fawn colour, with a faint odour of recently vomited matter, and a nauseous bitter taste. It forms a turbid solution with water in consequence of the presence of the starch, but the pepsine and lactic acid are completely dissolved. It is also soluble in weak spirit but not in strong alcohol. The watery solution precipitates with salts of lead and mercury, but not with nitrate of silver. If a solution of pepsine in water be heated to a temperature of 120° F. it becomes turbid and no longer possesses its digestive properties.

ADULTERATIONS.—Pepsine is often very badly prepared or undergoes decomposition from being kept in a damp place exposed to the air, and is consequently inert. The only reliable test for its goodness is its power of dissolving fibrin as above indicated. This same test will detect some spurious preparations which are also sometimes sold for true medicinal pepsine.

THERAPEUTICAL PROPERTIES.—This substance was first introduced into the practice of medicine by M. Corvisart under the name of *poudre nutrimentive (pepsine acidifiée)* as a remedy in dyspepsia and consumption. It can however in my opinion be regarded in no other light than as an artificial aid to digestion, supplying the deficiency of gastric juice which exists in some disordered states of the stomach, and therefore should be employed as a palliative only and not as a medicine. Its properties indicate in what cases it is likely to prove useful; but like other therapeutical agents too highly vaunted at first, it is now falling much into disuse.

DOSE AND MODE OF ADMINISTRATION.—Numerous preparations, solutions, syrups, &c. of pepsine have had their proposers and supporters, but M. Boudault's powder is the only one deserving of use. It may be given in doses of 15 grains immediately before meals and can be taken when spread between two thin slices of bread and butter, or dissolved in a tablespoonful of soup, which however should not be hotter than new milk.

PLUMBI IODIDUM, D. L. E.—*Iodide of Lead.*

PREPARATION.—" Take of nitrate of lead; iodide of potassium, of each, ℥j.; distilled water, Oij. Dissolve, with the aid of heat, the nitrate of lead in a pint, and the iodide of potassium in half a pint of the water, and mix the two solutions when cold. Decant the clear solution when the precipitate has subsided, and having transferred the latter to a filter, wash it with the remainder of the water. Finally, dry the product at a temperature not exceeding 212°, and preserve it in a close bottle," D. " Acetate of lead, ℥ix.; iodide of potassium, ℥vij.; distilled water, cong. j.; dissolve the acetate of lead in Ovj. of the water and strain; add to this the iodide of potassium first dissolved in Oij. of the water, wash what is precipitated, and dry it," L. " Iodide of potassium, and nitrate of lead, of each, ℥ss.; water, Oiss.; dissolve the salts separately, each in one-half of the water; add the solutions, collect the precipitate on a filter of linen or calico, and wash it with water; boil the powder in cong. iij. of water acidulated with f℥iij. of pyroligneous acid. Let any undissolved matter subside, maintaining the temperature near the boiling point, and pour off the clear liquor, from which the iodide of lead will crystallize on cooling," E.

PROPERTIES.—Iodide of lead occurs in the form of a fine golden-yellow powder, or in brilliant crystalline scales of the same colour; odourless and tasteless. It is permanent in the air, but by exposure to light loses its brilliancy, and consequently the London College directs the light to be excluded from it: by heat it is fused. It is soluble in 1990 parts of cold, and 1330 parts of boiling water, and is very slightly soluble in alcohol and ether (Wittstein); it is more soluble in solution of potash. The composition of iodide of lead is Pb I.

ADULTERATIONS.—I have not met with any adulterations in iodide of lead. The following tests for its purity are given in the London and Edinburgh Pharmacopœias:—" Pulverulent, yellow, soluble in boiling water, from which when cold it is deposited in brilliant yellow scales; it melts by heat, and for the most part passes off, first in yellow and then in violet vapours; if sulphate of soda be added to a solution by heat of 100 grains in boiling nitric acid diluted with two parts of water, 66 grains of sulphate of lead are precipitated," L. " Bright yellow; gr. v. are entirely soluble with the aid of ebullition in f℥j. of pyroligneous acid diluted with f℥iss. of water; and golden crystals are abundantly deposited on cooling," E.

THERAPEUTICAL EFFECTS.—The effects of this preparation are not well understood; according to some, its internal use produces the constitutional action of lead;* according to others, that of iodine. In this country it is rarely given internally. Externally it is applied in the form of ointment to chronic glandular enlargements, indolent ulcers, and obstinate cutaneous affections occurring in strumous habits. In porrigo capitis I have used it with excellent results, and increased experience confirms the opinions I have published on its efficacy in this disease, for which I was the first to propose its employment.† It is also used with very great benefit as an application to cancerous tumours, for which purpose it is particularly adapted from its not producing any cutaneous irritation, and from its being more actively promotive of absorption than the other preparations of iodine.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. to gr. v. made into pill with conserve of roses or extract of liquorice.

Unguentum Plumbi Iodidi, D. L. ("Take of iodide of lead, in fine powder, ʒj.; ointment of white wax, ʒvij. Mix the iodide of lead intimately with the ointment by trituration," D. "Iodide of lead, ℥j.; lard, ℥viij.; rub together and mix," L.). Half a drachm of this ointment may be rubbed in very gently twice a day over cancerous or other tumours. I usually employ it at first of half this strength.

INCOMPATIBLES.—Sulphuric and carbonic acids; and their salts.

POTASSII BROMIDUM.—*Bromide of Potassium.*

PREPARATION.—" Bromine, ℥ij.; carbonate of potash, ℥ij. ʒj.; iron filings, ℥j.; distilled water, Oiij.; first add the iron, and then the bromine to Oiss. of the distilled water; set them by for half an hour, frequently stirring them with a spatula. Apply a gentle heat, and when a greenish colour occurs, pour in the carbonate of potash dissolved in the remainder of the water; strain, and wash what remains in Oij. of boiling distilled water, and again strain. Let the mixed liquors be evaporated so that crystals may be formed," *London Pharmacopœia*, 1836.

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* The constitutional effects produced by the action of any of the preparations of lead when gradually introduced into the system, are now well recognized, and have been very fully described by many writers, from the publication of the classical essays of Sir George Baker, to that of the comprehensive and learned volume of M. Tanquerel des Planches. Consistently with the scope of this work, however, a mere allusion only to them can be given here. They are chiefly characterized by the occurrence of symptoms of irritation and of paralysis affecting the brain and nervous system, the digestive organs, and the muscular system, which proceed with gradually increasing intensity, eventually terminating in death, unless the cause be removed. The most prominent are the lead colic, severe muscular rheumatism, and paralysis of the muscles of the forearms. Simultaneous with or more usually preceding the developement of these characteristic symptoms, a purple or dark blue line, as originally noticed by Dr. Burton, may be perceived along the borders of the gums where they meet the teeth, and in doubtful cases this sign is of great importance as leading to a correct diagnosis; but it should be remembered that this blue mark is occasionally produced by the action of mercury on the gums. It need scarcely be remarked that the first point in the treatment of those cases of lead poisoning is to remove the cause, a point sometimes difficult of being accomplished, by so many ways and so insidiously is lead often introduced into the system. On this part of the subject some highly interesting and practical observations are contained in an excellent little work by Mr. Bower Harrison of Manchester on the contamination of water by lead. As a counter-poison, so to say, the iodide of potassium has been used successfully, but the remedies which I have found most beneficial are strychnia or the extract of nux-vomica, the vegetable acid salts of iron, and magnetic electricity.

† Treatise on Diseases of the Skin, 1852. Treatise on Diseases of the Scalp, 1848, p. 43; and Dublin Quarterly Journal of Medical Science, new series, vol. viii. p. 164.

PROPERTIES.—This salt crystallizes in colourless, transparent, rectangular prisms or cubes. It is inodorous, but has an acrid saline taste; it is very soluble in water, and but slightly soluble in alcohol. The crystals are unalterable in the air, exposed to heat they decrepitate, and fuse at a red heat without undergoing any change. The composition of bromide of potassium is K Br.

ADULTERATIONS.—If this salt contains any sulphate, it will give a white precipitate with solution of chloride of barium. It is often adulterated with chloride of potassium or chloride of sodium; the following was the test given by the London College for the detection of either impurity:—"Gr. x. decompose 14·28 grains of nitrate of silver, precipitating a yellow bromide of silver which is little effected by nitric acid, but is re-dissolved by ammonia." If it decompose more nitrate of silver than the quantity above stated, it is owing to the presence of a chloride. Dr. Garrod has recently called attention to the fact of iodide of potassium being sold in many of the London houses for the bromide.

THERAPEUTICAL EFFECTS.—The effects of bromide of potassium are generally stated to be analogous to those of iodide of potassium, which will be presently stated: with this opinion, my own experience of its action leads me completely to coincide. Dr. Williams of London employed it internally in enlargements of the spleen, in which he states that it possesses unusual, if not specific powers; but it has not proved equally successful in the hands of other practitioners. Externally it has been employed in the form of ointment to scrofulous and indolent swellings. It is, however, so rarely used now that it has been omitted from the last edition of the London Pharmacopœia. Sir C. Locock stated recently that he has found bromide of potassium remarkably efficacious in hysterical epilepsy in doses of from 5 to 10 grains daily, especially when the disease accompanies or depends on the menstrual state.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij to gr. xij. three times a day, dissolved in water and sweetened with syrup. For an ointment, ℈j. to ʒij. of the salt, may be combined with ℥j. of lard; if a stronger ointment, or one resembling the compound iodine ointment, be wished for, min. vj. of bromine are to be added to this.

INCOMPATIBLES.—Acids; acidulous and metallic salts.

POTASSII IODIDUM, D. L. E.—*Iodide of Potassium. Hydriodate of Potash.* (Syn. *Potassæ Hydriodas*, D.).

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. "Take of pure iodine, reduced to powder, four ounces and a-half;

filings, or thin turnings of wrought iron, separated from impurities by a magnet, two ounces; pure carbonate of potash, two ounces and a-half, or a sufficient quantity; distilled water, three pints and a-half: heat gently five ounces of the water with the iron and three ounces of the iodine for twenty minutes, and then boil until the solution loses its red colour. Filter this through paper, washing the filter with five ounces of water at a boiling temperature, and, in the solution thus obtained, dissolve, by digestion and shaking, the remainder of the iodine. To the carbonate of potash, dissolved in a quart of the water, and heated to 212° in a large porcelain capsule, add the solution of iron and iodine, and boil until effervescence ceases, adding, if necessary, a little more carbonate of potash, so that the liquor may be very slightly alkaline. Filter now, washing the precipitate with the remaining pint of water boiling hot, and having evaporated the liquid till a pellicle begins to appear on its surface, let it be set by, that crystals may form. These, when dried on blotting paper, should be preserved in a bottle furnished with a perfectly tight stopper. The liquor from which the crystals have separated will, by further evaporation and cooling, afford an additional quantity of the salt," D. "Iodine (dry), ʒv.; fine iron wire, ℥iij.; water, Oiv.; carbonate of potash (dry), ℥ij. ʒxj.; with the water, iodine, and iron wire, prepare solution of iodide of iron as directed for *Ferri Iodidum*. Add immediately, while it is hot, the carbonate of potash previously dissolved in a few ounces of water, and stir carefully, filter the product, and wash the powder on the filter with a little water. Concentrate the liquor at a temperature short of ebullition, till a dry salt be obtained; which is to be purified from a little red oxide of iron and other impurities, by dissolving it in less than its own weight of boiling water, or still better, by boiling it in twice its weight of rectified spirit, filtering the solution, and setting it aside to crystallize. More crystals may be obtained by concentrating and cooling the residual liquor," E.

PHYSICAL PROPERTIES.—This salt crystallizes in white, semi-opaque, anhydrous cubes or quadrangular prisms; at present it is generally met with in fragments of well defined cubes six to eight lines square, and having a pearly lustre; it has a pungent, saline, rather disagreeable taste, but is inodorous.

CHEMICAL PROPERTIES.—Iodide of potassium is composed of one equivalent of potassium and one of iodine, K. I. It does not deliquesce when pure, unless there is much moisture in the atmosphere; exposed to heat it decrepitates, and fuses at a red heat, but is not decomposed, though after fusion it has an alkaline reaction. 100 parts of water at 64° dissolve 143 parts of the salt: it is soluble in 5 or 6 parts of alcohol. The watery solution is neutral when pure; it possesses the property of dissolving iodine in large quantity, forming a brown liquid termed *ioduretted iodide of potassium.*

ADULTERATIONS.—Iodide of potassium, as met with in the form of large cubical crystals, seldom contains any impurity. Formerly, when it was not so carefully crystallized, it was very frequently adulterated with carbonate of potash. This fraud is readily detected by the alkalinity of the specimen, by its being deliquescent, and by its giving white precipitates with nitrate of baryta or with lime-water. Water is sometimes present as an impurity; it may be detected by drying the salt and ascertaining the loss of weight. If the salt contains *iodate of potash*, it becomes of a pinkish colour and emits an odour of iodine when kept for some time; its presence may be readily detected by adding tartaric acid to a solution in distilled water; if any iodate be present, free iodine will be immediately developed. The freedom from chloride of potassium or of sodium, impurities not unfrequently met with, is best ascertained by the following test :—" A solution of gr. v. in f℥j. of distilled water, precipitated by an excess of solution of nitrate of silver, and then agitated in a bottle with a little aqua ammoniæ, yields quickly by subsidence a clear supernatant liquid, which is not altered by an excess of nitric acid, or is rendered merely hazy," *Edinburgh Pharmacopœia.* The following are the characteristics and tests for iodide of potassium, contained in the last edition of the London Pharmacopœia :—" Soluble in six or eight parts of rectified spirit ; very soluble in water ; this solution slightly or not at all changes turmeric paper brown ; it does not alter the colour of litmus; nitric acid and starch being added together to it, it becomes blue, a change not produced by tartaric acid and starch ; it gives a yellow precipitate, soluble in boiling water with acetate of lead, but it does not precipitate with lime water or chloride of barium ; moreover, if the precipitate produced by nitrate of silver be digested in stronger solution of ammonia and nitric acid added to the filtered liquor, it does not precipitate ; 100 grains dissolved in water, on the addition of nitrate of silver, yield a precipitate of 141 grains of iodide of silver." Iodide of potassium has been latterly much adulterated with bromide of potassium, owing to the high price of iodine; the adulteration must, however, be looked on as one of no importance, if, as I have already stated my opinion, their medical properties are identical.

THERAPEUTICAL EFFECTS.—Iodide of potassium is in many respects analogous in its operation to iodine; but it frequently produces very different physiological and therapeutical effects. Like iodine it is taken into the circulation, and may be detected in the different secretions and excretions for several days after it has been swallowed. In some persons iodide of potassium when given even in very small doses produces swelling of the face and tongue, followed by ptyalism, and this effect I have seen produced in one individual who had not taken more than ten grains of the salt. While on the other hand, many have continued its use for months without the production of iodism, or any other physiological effect whatever. In the different varieties of scrofula and in bronchocele, iodide of potassium is generally given in combination with iodine, the beneficial effects of which in these diseases it seems to increase much. In secondary syphilitic affections, few remedies are so much employed in the present day, or with so much benefit, as iodide of potassium : it is peculiarly adapted for those cases in which mercury has been administered in large quantity in the primary stage, or where the individual is of a scrofulous habit. The particular forms of secondary syphilis in which it is of most service are, sore throat, nodes, caries, and other diseases of the bones, and the tubercular eruptions of the skin. This salt has been also employed with much benefit in the treatment of articular rheumatism, in chronic rheumatism with alteration of structure, in lumbago, in sciatica, in periostitis, in dropsy, in amenorrhœa, in leucorrhœa, in chronic induration and enlargement of various organs, &c. I have already, when speaking of the therapeutical effects of iodine, referred to the efficacy of its salts in the treatment of cutaneous diseases; and it is from the iodide of potassium especially that I have derived the most beneficial results; in the various forms of psoriasis and lepra,* in icthyosis, and in lupoid ulcerations, my experience of it is highly favourable, and I have frequently seen recovery follow its use in cases in which arsenic had failed to produce any amendment. The external use of iodide of potassium in the form of ointment or of bath is usually advantageously combined with its internal administration. Professor Melsens, of Brussels, has proposed the use of iodide of potassium to remove the discoloration of the skin which is sometimes consequent on the internal employment of nitrate of silver, but his views have not been as yet sufficiently tested practically; he gives it in enormous doses, half a drachm, or even more, three times daily, and exposing the patient at the same time to a hot vapour bath, the iodine is brought to the surface when it may be readily detected in the perspiration.

DOSE AND MODE OF ADMINISTRATION.—Gr. ij. to gr. xv. three times a day; some physicians prescribe it in very large doses, ʒj. to ʒvj. in the 24 hours, in which quantity it is said not to produce any injurious effects. My own experience, however, is in favour of small doses, four or five grains daily, continued for a long time. It is best administered simply dissolved in water sweetened with syrup, or in some bitter infusion or decoction, as infusion of quassia, or decoction of elm bark. The power of the solution of dissolving iodine has been before referred to.

Liquor Potassii Iodidi compositus, D. L. (" Pure iodine, gr. v.; iodide of potassium, gr. x.; distilled water, Oj.; mix and dissolve," D. L.) Dose, fʒj. to f℥ss.

Iodinei Liquor compositus, E. (Iodine, ʒij.; iodide of potassium, ℥j.; distilled water, f℥xvj.; dissolve the iodine and the iodide in the water with gentle heat and agitation.) Dose, min. v. to min. xv. It may be further diluted with water.

Tinctura Iodinii composita, D. L. (" Pure iodine, ℥ss.; iodide of potassium, ℥j.; rectified spirit, Oj.; dissolve the iodine and iodide of potassium in the spirit," D. " Iodine, ℥j.; iodide of potassium, ʒij.; rectified spirit, Oij.; macerate until they are dissolved, and strain," L.) Dose, min. x. to min. xxx. in f℥j. of any aromatic water, or in white wine.

Unguentum Potassii Iodidi, D. L. (" Take of iodide of potassium, ʒj.; distilled water, fʒss.; ointment of white wax, ʒvij. Triturate the iodide of potassium with the water, then add the ointment, and rub them well together," D. " Iodide of potassium, ʒij.; boiling distilled water, fʒij.; lard, ℥ij.; dissolve the iodide in the water, and then mix with the lard," L.) This ointment may be preserved unchanged for months by the addition of a few drops of caustic potash ; this addition will also restore the white colour to an ointment which had already become yellow.

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* See Dublin Quarterly Journal of Medical Science, New Series, vol. viii. p. 240, and the Author's Treatise on Diseases of the Skin, 1852.

Unguentum Iodinii compositum, D. L. *Unguentum Iodinei*, E. (" Pure iodine, ʒss. ; iodide of potassium, ʒj. ; ointment of white wax, ʒxivss. ; rub the iodine and iodide of potassium well together in a glass or porcelain mortar, add the ointment gradually, and continue the trituration until a uniform ointment is obtained," D. " Iodine, ʒss. ; iodide of potassium, ʒj. ; rectified spirit, fʒj. ; lard, ℥ij. ; add the iodide, reduced to a state of the finest powder, and the iodine dissolved in the spirit, to the lard and rub together," L. " Iodine, ʒj. ; iodide of potassium, ʒij. ; lard, ℥iv. ; triturate together the iodine and iodide, add gradually the axunge, and make an ointment," E.) About the size of a nut of this ointment should be rubbed into the affected part twice or three times a day.

Emplastrum Potassii Iodidi, L. (Iodide of potassium, ℥j. ; prepared frankincense, ℥vj. ; wax, ʒvj. ; olive oil, fʒij. ; add the iodide previously rubbed up with the oil to the frankincense and wax melted together, and stir constantly until they are cold. This plaster is to be spread on linen rather than on tanned leather.) To be applied in strips over chronic enlargements of the joints, scrofulous tumours, and glandular swellings.

INCOMPATIBLES.—Acids; and acidulous and metallic salts.

SODII IODIDUM.—*Iodide of Sodium. Hydriodate of Soda.* This salt is not contained in any of the British Pharmacopœias.

PREPARATION.—Take of iron filings, ℥iij. ; distilled water, f℥xxxij. ; iodine, ℔j. ; carbonate of soda, a sufficiency ; place the iron filings with the water in a glass matrass, apply heat, and add the iodine gradually with constant agitation ; as soon as the mixture has acquired a greenish colour, filter, and add the carbonate of soda dissolved in distilled water until all the iron is thrown down ; filter, and evaporate the liquor to dryness ; dissolve the residuum again in distilled water and evaporate with a gentle heat until a pellicle forms on the surface ; then set aside to crystallize.

PROPERTIES.—This salt crystallizes in striated prismatic crystals somewhat resembling nitrate of potash ; they have a bitter slightly acrid taste, but not at all so disagreeable as that of the iodide of potassium. The crystals deliquesce rapidly, and acquiring a pink colour give off free iodine, being converted into the iodate and carbonate of soda,—a serious objection to the use of this preparation, but which may be obviated to a great extent by fusing the salt and reducing it to powder shortly after it is prepared. It is very soluble in water and in alcohol. It composition is Na I.

THERAPEUTICAL EFFECTS.—Iodide of sodium appears to be nearly analogous in action with iodide of potassium, to which it is preferred by Gamberini and other Italian physicians as being more readily assimilable, less disagreeable to the taste, and not so apt to derange the digestive organs. I have used it rather extensively for some years, and its chief advantages appear to me to be that while possessing equally powerful therapeutical effects with the similar salt of potassium, it forms an admirable substitute in cases in which the administration of the latter has been continued for a long time, and the system seems to become insensible to its action, and also in those cases with which the salt of potash appears to disagree. In the treatment of cutaneous affections especially, my experience of it is decidedly fovourable.

DOSE AND MODE OF ADMINISTRATION.—Same as of iodide of potassium (see page 466).

SULPHUR IODATUM, D. SULPHURIS IODIDUM, L.—*Iodated Sulphur. Iodide of Sulphur.*

PREPARATION.—"Pure iodine, in powder, ℥j.; sublimed sulphur, ʒij.; mix the iodine and sulphur by trituration in a mortar, and, having transferred the powder to a Florence flask, heat it gently till fusion is effected. When the flask has cooled, let it be broken in order to the withdrawal of the product, which should be immediately enclosed, and preserved in a well-stopped bottle," D. "Sulphur, ℥j.; iodine, ℥iv.; put the sulphur into a glass vessel, and the iodine over it; immerse the vessel in boiling water until they unite; and as soon as the iodide is cold, having broken the vessel, break into small pieces and keep in well closed glass vessels," L.

PROPERTIES.—This compound is met with in brownish plates, with a radiated crystalline structure. It has a strong odour of iodine, and an acrid taste. Its elements are easily disunited, the iodine escaping entirely when it is left exposed to the air. Its composition is probably $S^2 I$.

THERAPEUTICAL EFFECTS.—Iodide of sulphur has not been much used internally in medicine; its effects seem to resemble those of iodine; the dose is from gr. j. to gr. iij. three times daily in pill. Externally in the form of ointment, it has been employed with much success in the treatment of obstinate cutaneous diseases, particularly lupus, porrigo, acne indurata, herpes, and lepra. My own experience of it in chronic lichenoid eruptions, in the local forms of psoriasis, and in acne indurata, is very favourable.[*]

Unguentum Sulphuris Iodidi, L. (Iodide of sulphur, powdered, ʒss.; lard, ℥j; rub together.) A stronger ointment than this may be used in many cases.

INCOMPATIBLES.—Acids; acidulous, and metallic salts.

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[*] See Treatise on Diseases of the Skin, 1852.

CHAPTER XX.

TONICS.

(Corroborants.)

TONICS are medicines, the continued administration of which, in debilitated and relaxed conditions of the body, imparts strength and vigour without producing any sudden excitement. Tonics to a certain extent are stimulants, inasmuch as they arouse the vital energies, but the excitement is slowly produced, and the effect is permanent ; if, however, they are given when the system is in a healthy state, their primary action, like that of stimulants, is often followed by collapse. This, then, is another example of how necessary it is to remember that medicines are but relative agents, their effects being almost entirely dependant on the state of health or disease in which they are administered. Amongst those who have paid attention to the mode in which medicines act on the human economy, a difference of opinion exists as to whether tonics produce their effects by means of the nervous or circulating system, and this is a question which bears much on the indications for the therapeutical employment of these remedies. It can not be doubted but that some agents which are very generally and very beneficially had recourse to with the view of giving tone to the body, such as the shower bath, cold salt water bathing, open air exercise, &c., must produce their effects solely through the nervous system ; and it is in my opinion equally as certain that those medicines which act as tonics whether taken into the stomach or applied to some absorbing surface, do so by being first taken into the circulation, the nervous and muscular systems being secondarily acted on through the blood. The peculiar symptoms caused by the administration of quina in large doses, which will be described when speaking of that alkaloid, prove in a special manner that this is the correct view to take of the mode of action of these remedies. There is no class of medicines which requires more discrimination in their administration than tonics ; nor any, the injudicious use of which more frequently produces evil consequences. The diseases in which these remedial agents are principally employed, must manifestly be those of diminished power ; in no case, however, should they be prescribed where there is a tendency to irritation or inflammation of the digestive organs, or where the secretions are in a depraved state, without the previous use of means calculated to remove the former or correct the latter; to effect which, the employment of mild purgatives will, in most instances, be found best adapted. They are also indicated in some diseases which are inflammatory in their nature, such as erysipelas, diffuse inflammation and relative affections, which assume, as they so frequently do, a typhoid type, or are presented in asthenic habits. Tonics have a marked action on the various organs of secretion, their effects being to restore them to a healthy state ; they are consequently administered with the view of diminishing secretion when it is excessive or of restoring it when deficient, if either condition depends, as it often does, on inertia or want of tone in the secreting organ. They thus frequently act as diuretics, laxatives, emmenagogues, &c. Independently of their tonic properties, some of the remedies contained in this class possess a specific power in ague and other periodical diseases, and hence have been denominated *Febrifuges* : as examples, I may refer to cinchona bark, arsenic, &c. As already remarked, most astringents are tonics, (see page 52.)

ACIDUM MURIATICUM DILUTUM, D. E. ACIDUM HYDROCHLORICUM DILUTUM, L.—*Dilute Muriatic* (*Hydrochloric*, L.) *acid.*

PREPARATION.—"Take of pure muriatic acid, f℥iv. ; distilled water, f℥xiij. ; mix. The specific gravity of this acid is 1045," D. "Hydrochloric acid, f℥v. ; distilled water, f℥xv. ; mix. Specific gravity, 1043 ; a fluid ounce is saturated by 168 grains of crystals of carbonate of soda," L. "Muriatic acid, f℥iv. ; distilled water, f℥xij. ; mix," E.

Hydrochloric acid (described in the division *Caustics*), when properly diluted, acts as a tonic, and as such is employed in those forms of fever which were formerly supposed to depend on a putrescent condition of the fluids of the body, as in petechial fevers, malignant scarlatina, phagedenic ulceration of the throat, scurvy, &c. It is also an excellent tonic in diphtheria, in debility of the digestive organs, particularly when attended with a deposit of phosphates from the urine, and in that state of the alimentary canal which favours the generation of worms. Independently of its action as a caustic, dilute hydrochloric acid is an excellent addition to gargles in ulcerated sore throat, when there is no tendency to inflammation present; it is also employed with much advantage in the sore throat of scarlatina.

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒj. The dilute acid of the last edition of the Dublin Pharmacopœia is weaker than that of the previous edition, being now nearly of the same strength as that of the other colleges. It should be administered largely diluted with some bitter infusion, as infusion of quassia, or it may be substituted for sulphuric acid in preparing the infusion of roses; fʒj. to fʒij. may be added to an eight ounce gargle.

INCOMPATIBLES.—Alkalies; tartar emetic; tartrate of potash; nitrate of silver; acetate of lead; and all carbonates.

ACIDUM NITRICUM DILUTUM, D. L. E.—*Dilute Nitric acid.*

PREPARATION.—"Take of pure nitric acid, f℥iv.; distilled water, f℥xxix.; mix. The specific gravity of this acid is 1092," D. "Nitric acid, f℥iij.; distilled water, f℥xvij.; mix. Specific gravity, 1082; a fluid ounce is saturated by 154 grains of crystals of carbonate of soda," L. "Mix together f℥ix. of distilled water and f℥j. of pure nitric acid, or f℥j.fʒss. of commercial nitric acid. Density, 1077," E.

Nitric acid (described in the division *Caustics*), when properly diluted, acts as a general tonic, but its powers as such are less manifest than those of the other mineral acids. It is principally used internally in the treatment of chronic hepatitis, in affections consequent on the excessive administration of mercury, and in secondary syphilitic diseases. In syphilis it has been proposed as a substitute for mercury, but its beneficial influence appears to be limited to those cases in which scrofula or very great debility forbids the use of that medicine, but which, as has been so ably shown by the late Mr. Colles of this city, are very few in number, and frequently depend rather on its injudicious administration.

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒj. The dilute acid of the Dublin college is now of nearly the same strength as that of the other Pharmacopœias. It may be administered in the same form as hydrochloric acid; but it is most usually given in the compound decoction of sarsaparilla.

INCOMPATIBLES.—Alcohol; alkalies; oxides; earths; sulphate of iron; acetate of lead; acetate of potash; and all carbonates, and sulphurets.

ACIDUM NITROMURIATICUM, D.—*Nitromuriatic acid. Aqua regia.*

PREPARATION.—Take of pure nitric acid, f℥j.; pure muriatic acid, f℥ij.: mix in a green glass bottle, furnished with an accurately ground stopper, and keep in a cool place.

PROPERTIES.—This liquor has a deep yellow colour, an intensely acid taste, and exhales an odour both of chlorine and nitrous acid. It is a solution of chlorine and of nitrous acid in water, ($Cl\ NO^4\ HO$). Its most remarkable property is its power of dissolving the metals gold and platinum, by which it may be readily distinguished from other acids.

THERAPEUTICAL EFFECTS.—Nitro-muriatic acid was at one time employed internally in the same cases as nitric acid; but at present it is only used externally in the form of bath. Thus employed, it is a very useful remedy in chronic induration or abscess of the liver, in secondary syphilitic eruptions, and in syphilitic or mercurial cachexia. When its employment has been continued for some time, it frequently causes salivation, which is to be regarded as evidence of its sanatory influence.

DOSE AND MODE OF ADMINISTRATION.—Internally, gtt. x. to gtt. xx. largely diluted.

Balneum Acidi Nitromuriatici, (Nitromuriatic acid, f℥ivss.; water, cong. iij.; mix in a wooden vessel.) This is to be used daily in the form of a foot-bath; the feet should be kept in the bath for from 15 to 20 minutes, and afterwards rubbed well with flannels. Dr. Scott of Bombay affirms that this bath operates like a charm, and produces immediate ease, when employed during the passage of biliary calculi through the duct.

ACIDUM PHOSPHORICUM DILUTUM, L.—*Diluted Phosphoric Acid.*

PREPARATION.—Phosphorus, ʒvj.; nitric acid, f℥iv.; distilled water, f℥viij.; add the phosphorus to the acid mixed with the water in a retort placed in a sand-bath, then apply heat till f℥viij. are distilled. Put these again into the retort that f℥vj. may distil, which are to be rejected; evaporate the remaining liquor in a platinum capsule, until only f℥ij. remain. Lastly, add to the acid when it is cold as much distilled water as may be sufficient to make it accurately measure Oj., and mix.

PHYSICAL PROPERTIES.—This is a colourless, inodorous, transparent liquid, with an intensely acid taste. Its density is 1·064 at 62° F.

CHEMICAL PROPERTIES.—It is a solution of phosphoric acid, PO^5 in water; the London preparation containing 8·7 per cent. of acid. It possesses the usual characteristics of a mineral acid. "Chloride of barium or nitrate of silver being added, whatever is thrown down is readily dissolved by nitric acid. Strips of copper or silver are not at all acted upon by it, nor is it coloured either before or after the immersion of the strips when hydrosulphuric acid is added; a fluid ounce is saturated by 132 grains of crystals of carbonate of soda, and nothing is thrown down," *London Pharmacopœia.*

THERAPEUTICAL EFFECTS.—Diluted phosphoric acid possesses the tonic properties of the other mineral acids and may be employed in cases of debility of the digestive organs, and in general cachexia. It is particularly adapted for those cases in which there is a deposit of phosphates from the urine; the earthy phosphates being soluble in an excess of their own acid. It has been also used, and it is stated with much benefit in cases of unusual depositions of phosphate of lime, as in exostosis, or in the formation of bony tumours; and largely diluted as a common drink in diabetes. Diluted phosphoric acid is, however, not much used.

DOSE AND MODE OF ADMINISTRATION.—Min. xx. to fʒj. properly diluted.

INCOMPATIBLES.—Lime water; calcareous salts; carbonate of soda; and strychnia.

In cases of poisoning with this acid, the same treatment should be followed as in poisoning with hydrochloric acid, (see page 157.)

ANTHEMIS, L. E. CHAMÆMELUM, D.—*Chamomile. The flowers of Anthemis nobilis.* Indigenous, belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua.*

BOTANICAL CHARACTERS.—Stem, about a foot long, procumbent; Leaves, bipinnate, a little downy; Branches, numerous, each branch terminated by a single flower, whose disk is yellow, at length conical, and ray white.

PHYSICAL PROPERTIES.—Chamomile flowers have a strong, peculiar, rather agreeable odour, and an aromatic bitter taste.

CHEMICAL PROPERTIES.—Their most important chemical constituents are bitter extractive and volatile oil. The latter, *Oleum Anthemidis*, D. L. E. is an article of the Materia Medica in the London Pharmacopœia, in which the English oil is directed to be employed, and is ordered by the Dublin and Edinburgh Colleges to be obtained by the usual process of distillation. It is of a greenish blue colour, and has the peculiar odour and the aromatic taste of the flowers. A hundred weight of flowers yields from f℥iss. to f℥ij. of the oil. Its specific gravity is 0·9083. It contains a hydrocarbon, and an oxidated oil, the last of which treated with potash infusion gives *valerianic acid*, (Gerhardt and Cahours.) Chamomile flowers yield their active properties to both water and alcohol. The single variety of the chamomile flower as directed in the Edinburgh Pharmacopœia, should be preferred for medical purposes.

THERAPEUTICAL EFFECTS.—Chamomile is an aromatic and bitter tonic. It was formerly in high esteem as a remedy for intermittent fever, but its employment as an internal medicine is at present restricted to those forms of dyspepsia which depend on debility or want of tone of the digestive organs; in which cases it is exceedingly useful. A concentrated infusion produces vomiting, and was consequently at one time much used to aid the action of emetics. Chamomile flowers are commonly employed for preparing warm fomentations. A strong infusion applied cold two or three times a day is an excellent application in simple weakness of the eyes, and in the milder forms of hemorrhoidal discharges.

DOSE AND MODE OF ADMINISTRATION.—The powder is not administered, the dose would be from ʒss. to ʒij.; the dose of the oil is from min. iij. to min. viij.

Infusum Anthemidis, D. L. E. ("Chamomile flowers, dried, ℥ss.; boiling water, f℥xij.: Infuse for fifteen minutes, in a covered vessel, and strain. The product should measure about eight ounces," D. "Chamomile, ℥v.; boiling distilled water, Oj.; infuse for ten minutes in a covered vessel, and strain," L. "Chamomile, ℥v.; boiling water, Oj.; infuse for twenty minutes in a covered vessel and then strain through linen or calico," E.) If taken warm, it produces vomiting. The dose of the cold infusion is f℥j. to f℥ij.

Extractum Anthemidis. E. (Chamomile, ℔j.; boil it with cong. j. of water to Oiv.; filter hot; evaporate in the vapour bath to the right consistence.) The volatile oil is dissipated in the preparation of this extract, but it is an excellent bitter tonic; Dose, gr. x. to ʒss.

INCOMPATIBLES.—*With the infusion:* the mineral acids; sesquisalts of iron; sulphate of copper; nitrate of silver: acetate of lead; and corrosive sublimate.

ARGENTI CHLORIDUM.—*Chloride of silver.* This salt is readily obtained by the double decomposition of solutions of nitrate of silver and of chloride of sodium. When first precipitated it is white, but on exposure to light soon acquires a dark brown, almost black colour. It is insoluble in water or in alcohol, and is void of odour and taste.

THERAPEUTICAL EFFECTS.—Chloride of silver has been employed both in America and on the Continent as a substitute for the nitrate of silver in the treatment of several diseases; and has been also used with success as a remedy in primary and secondary syphilitic affections. It is stated not to produce the discoloration of the skin caused by the nitrate; but from its limited employment hitherto, I do not think that such a conclusion can be depended on; the more especially as it is admitted by all that the nitrate of silver is converted into the chloride immediately on its being taken into the stomach.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. four or five times daily, made into pill with conserve of roses or extract of liquorice.

ARGENTI NITRAS.—*Nitrate of silver* (described in the division *Caustics*), may be administered internally in much larger doses than might *à priori* be supposed from its caustic action when applied to the surface of the body; whence it would appear to be decomposed by the free acids of the stomach. Nevertheless, when taken in large quantity, it acts as a powerfully corrosive poison. In small but frequently repeated doses, this salt is an excellent tonic, and also appears to have a specific influence over some convulsive disorders. As a tonic, it is one of the best that can be employed in the early stages of tubercular phthisis; in chronic affections of the stomach especially when there is morbid sensibility of the gastric and intestinal nerves; and in angina pectoris. The principal convulsive disorders in which nitrate of silver has been used are epilepsy and chorea, in both of which it proves very frequently successful, perhaps more so than most other remedies. Its administration must, however, be persevered in for a very long time; and this is attended with a very serious disadvantage, and one which has brought this remedy into great disrepute, namely the communication of an indelible and permanent leaden or bluish-gray hue to the skin over the whole body. Various attempts have been made to account for this phenomenon, but none are at all satisfactory to my mind; it is certain that this consequence has occured so frequently (I have myself seen several instances of it), and is of so disagreeable a nature, as to more than counterbalance its remedial powers.

DOSE AND MODE OF ADMINISTRATION.—1-6th of a grain gradually increased to gr. ij. or gr. iij. three times a day; in some instances so large a dose as gr. xv. has been taken. It is best administered in the form of pill, as the solution blackens the skin wherever it touches it, and also acts more energetically on the stomach. The pills should be made with some vegetable extract, as extract of gentian or of liquorice; crumb of bread is frequently ordered for this purpose, but it usually contains chloride of sodium, which decomposes nitrate of silver. The most certain method to prevent the discoloration of the skin, is not to continue the use of the medicine too long. The late Dr. James Johnson, of London, stated, "that there is no instance on record where the complexion has been affected by the medicine when restricted to three months' administration." The late Dr. A. T. Thomson suggested the combined use of dilute nitric acid to prevent the decomposition of the nitrate; and more recently, Dr. Patterson, of Rathkeale, proposed the employment of the iodide (prepared by precipitating a solution of nitrate of silver with a solution of iodide of potassium), instead of the nitrate of silver, which he asserts is equally efficacious as a remedy without possessing this great disadvantage. The plan of treatment proposed by Dr. Melsens of Brussels, for removing the discoloration when it has occurred, has been before referred to (see page 466).

Liquor Argenti Nitratis, L. *Solutio Argenti Nitratis*, E. ("Nitrate of silver, ʒj.; distilled water, f℥j.; dissolve and strain," L. "Nitrate of silver, gr. xl.; distilled water, gr. 1600; dissolve the salt in the water and keep the solution in well-closed bottles," E.) Used only as a test.

INCOMPATIBLES.—Spring and river water; the alkalies, and their carbonates; lime water; hydrochloric, sulphuric, phosphoric, tartaric and hydrocyanic acids, and their soluble salts; iodide of potassium; solution of arsenite of potash; solution of soap; and astringent vegetable infusions.

In poisoning with nitrate of silver, the best antidote that can be employed is common salt; its administration should be followed by demulcent drinks, and if inflammatory symptoms arise, the usual antiphlogistic means.

ARGENTI OXYDUM, D.—*Oxide of Silver.*

PREPARATION.—Take of nitrate of silver, ℥ss., lime water, cong. ss., or a sufficient quantity; distilled water, Oss. Dissolve the nitrate of silver in four ounces of the distilled water, and having poured the solution into a bottle containing the lime-water, shake the mixture well and then set it by till the sediment subsides. The supernatant solution being drawn off, let the sediment be placed upon a filter, and when washed with the remainder of the distilled water, let it be dried at a heat not exceeding 212°, and preserved in a bottle.

PHYSICAL PROPERTIES.—Oxide of silver when first precipitated is an olive brown powder which becomes darker coloured when dried; it is odourless and tasteless, its specific gravity is 7·143.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of metallic silver, and 1 of oxygen (Ag. O). It is slightly soluble in water, the solution acting on vegetable colours feebly alkaline; and is freely soluble in solution of caustic ammonia with which it forms a highly explosive compound. Oxide of silver is readily resolved, by heat or by prolonged exposure to light, into oxygen gas and metallic silver.

THERAPEUTICAL EFFECTS.—This preparation has been employed for some years back in the same cases as the nitrate of silver, over which it does not appear to me to possess any advantages, certainly, none sufficient to warrant its introduction into the last edition of the Dublin Pharmacopœia. It has been chiefly recommended as a remedy in chronic affections of the stomach and in menorrhagia. As a local application oxide of silver has been applied in the form of ointment to the urethra in gonorrhœa, by means of a bougie.

DOSE AND MODE OF ADMINISTRATION.—In pill gr. ss. to gr. ij. three times a day. To prepare an ointment of it ʒj. may be combined with ℥j. of lard.

ARSENICUM ALBUM.—*Arsenic* (described in the division *Caustics*) is a powerful irritant poison, a few grains being sufficient to occasion death. Its effects when taken in poisonous doses vary remarkably; in some instances the most prominent symptoms are those of inflammation of the gastro-intestinal membrane; while in others, coma and extreme depression of the circulation are most marked. When administered in minute doses for a short period, it appears to act as a general tonic, without producing any remarkable physiological effect; but if its use be long continued, or the doses given be too large, it acts as a slow poison. In medicine it has been principally used internally as an *anti-periodic*, in the treatment of ague, and of other diseases of an intermittent type, as in forms of neuralgia, chorea, and periodic headache; and its employment in these affections is often attended with the most beneficial results, more especially in cases in which quina either disagrees with the patient or fails to cure the disease. In chronic cutaneous diseases, particularly chronic eczema and lichen, those of a scaly character, and those which affect the scalp, arsenic is prescribed with excellent effect; in many cases, however, it will be found to fail in effecting a cure even after it has been taken for some time, when an immediate good result will be often obtained by employing a different preparation of the metal from that which had been previously prescribed; and in all cases of skin disease I have found the best results to follow from repeatedly changing the form in which arsenic is given ; as also from combining it with other tonics, with stimulants or with purgatives, according to the state of the general health of the patient. It has been also employed as an internal remedy, in epilepsy; in chronic rheumatism, especially when attended with change of structure in the joints ; in passive dropsy ; in secondary syphilis ; in lupus, &c. When the use of any arsenical preparation has been continued for some time, especially in gradually increasing doses, it produces in most persons, and in some much sooner than in others, peculiar symptoms which seem to indicate the saturation of the system with the medicine; the most common of these are gastric derangements with loss of appetite and pain after eating, puffing or swelling of the face and hands, and redness and swelling of the eyelids accompanied often by tenderness of the eyes, and not unfrequently by conjunctivitis; I have also noticed in some cases sharp headache, and flushings of the face occurring frequently, to follow the administration of arsenic for even a short period. When any of these symptoms occur the employment of the arsenic should be suspended for a few days, active purgatives given, and its use recommenced in smaller doses. So far from considering the development of this *arsenical saturation* necessary to the therapeutical action of the metal, I have generally seen beneficial results produced more certainly and more quickly in those persons in whom it does not occur.

DOSE AND MODE OF ADMINISTRATION.—The employment of arsenic as a remedy requires great caution, and its effects must be carefully watched ; it may be administered in substance in doses of from 1-16th to 1-8th of a grain made into pill with crumb of bread; but, in consequence of the great difficulty of accurately dividing so small a quantity into pills, some of the liquid preparations described below are usually preferred. Should any preparation of arsenic be prescribed for persons who are liable to derangement of the digestive organs, it is advisable that the dose should be always taken immediately after meals.

Liquor Arsenicalis, D. E. *Liquor Potassæ Arsenitis*, L. ("Take of pure arsenious acid ; pure carbonate of potash, of each, gr. lxxij. ; compound tincture of lavender, f℥ss. ; distilled water, as much as is sufficient. Introduce the arsenious acid and carbonate of potash into a flask containing half a pint of water, and boil until a perfect solution is obtained. When this has cooled add to it the compound tincture of lavender, and as much water as will make the bulk of the entire one pint. The specific gravity of this solution is 1013," D.

"Arsenious acid, broken into small fragments; and carbonate of potash, of each, gr. lxxx.; compound tincture of lavender, fʒv.; distilled water, Oj.; boil the acid and carbonate with half a pint of the water till they are dissolved; add the tincture to the cooled liquor, and then, sufficient water till the whole measures Oj.," L. "White arsenic, in powder; and carbonate of potash, of each, ℈iv.; compound tincture of lavender, fʒv.; water, Oj.; dissolve the oxide and carbonate together in half the water with the aid of heat; filter if necessary, add the tincture to the liquid when cold and then dilute it with water till the whole measures one pint," E.) One fluid drachm of this preparation, commonly known as Fowler's solution, contains gr. ss. of arsenious acid; the preparation of the Dublin College is a little weaker. Dose, min. v. gradually increased to min. viij. two or three times a day.

Arsenical Solution, DEVERGIE. (Arsenic; and carbonate of potash, of each, gr. ij.; distilled water, f℥xvj.; tincture of cochineal, sufficient to colour it; dissolve.) Every fluid ounce contains 1-8th of a grain of arsenic. The advantage it possesses over Fowler's solution is that the preparation being so much weaker and consequently the dose so much larger, dangerous accidents from an over-dose are not so likely to occur. Either solution is incompatible in prescription with acids, lime water, chloride of calcium, sulphate of magnesia, sulphate of iron, sulphate of copper, alum, iodide of iron, nitrate of silver, infusion and decoction of bark, &c.

Liquor Arsenici Chloridi, L. (Arsenious acid in small fragments, ʒss.; hydrochloric acid, fʒiss.; distilled water, Oj.; boil, until dissolved, the arsenious acid with the hydrochloric acid mixed with an ounce of the water; then add sufficient water that the entire may accurately fill a pint measure.) *De Valangin's Mineral Solution.* This preparation is incorrectly named by the London College, as it is only a solution of arsenic in hydrochloric acid. Every fluid ounce contains a grain and a half of arsenious acid; it is therefore weaker than Fowler's solution. By many it is preferred to any other preparation of arsenic for internal use, especially as being less liable to produce poisonous symptoms or to derange the digestive organs; and increased experience of its effects since the last edition of this book was published induces me to alter the opinion then expressed, and to recommend it as a safe and useful preparation in many cases. Dose, min. iij. to min. x. three times a day.

Pilulæ Asiaticæ. (Arsenious acid, ʒj.; black pepper, ʒix.; liquorice root powdered; and mucilage, of each, q. s.; mix and divide into 800 pills.) This is a most excellent combination, and one highly praised in the East Indies as a remedy for elephantiasis, lepra, psoriasis, and syphilitic eruptions; I have found it especially useful in languid habits of body and in cases where other preparations have been continued for some time without producing benefit. Each pill contains about 1-13th of a grain of arsenious acid. Dose, one or two daily.

Ioduretted Solution of the Iodide of Potassium and Arsenic, AUTHOR. (Arsenical solution, min. lxxx.; iodide of potassium, gr. xvj.; pure iodine, gr. iv.; syrup of orange flowers, f℥ij.; dissolve.) Every drachm of this solution contains five minims of arsenical solution, a grain of iodide of potassium, and a fourth of a grain of iodine; it may be administered in a wineglassful of water, and being very agreeable to the taste, is easily taken even by children. I have used it very extensively in the treatment of obstinate cutaneous diseases with excellent results.* It is of a rich wine yellow colour, and keeps unchanged for months.

In poisoning with arsenic, if the stomach-pump be at hand it should be immediately used, and the stomach repeatedly washed out with tepid water in which the hydrated sesquioxide of iron is suspended. The mode of preparing this substance which is the best antidote for arsenic, and the manner in which it is to be used will be described hereafter. In the absence of the stomach-pump, emetics of sulphate of zinc or sulphate of copper should be administered, and vomiting promoted by demulcent drinks. Magnesia has been also recently proposed as an antidote for arsenic; from the observations of Christison it appears that dense or *heavy* magnesia possesses little or no action on it, but magnesia in the gelatinous state, or the *light* magnesia at present pretty generally manufactured, removes arsenic from its solution in water. If light calcined magnesia be used as an antidote in cases of poisoning with arsenic, it should be administered in the proportion of between thirty and fifty parts to one of the poison.

AURANTII CORTEX, L. E. CITRUS BIGARADIA, FRUCTUS TUNICA EXTERIOR ET OLEUM VOLATILE, D.—*Bitter-orange peel,* L. E. *The rind of the fruit and the volatile oil of Citrus bigaradia,* D. *The outer rind of the fruit of Citrus bigaradia,* L. *Rind of the fruit of Citrus vulgaris,* E. The three British Colleges intend to refer the officinal products to the bitter orange tree, which has only been lately separated as a distinct species from the Citrus aurantium (described in the division *Refrigerants.*) It differs, in being a smaller tree with more distinctly winged leaf-stalks, in the bitterness of the pulp, and the greater aroma of the rind of the fruit.

PROPERTIES.—The rind of the Seville or bitter-orange is cut into narrow pieces and dried, the inner white part having been previously removed. It is in rugged, uneven slices, of a dark orange-yellow colour; has a peculiar fragrant odour, and a warm bitter taste, both of which depend on a volatile oil which exists in concave minute vesicles. This oil which is an article of the Materia Medica in the Dublin Pharmacopœia, is prepared on the Continent both by expression and distillation; its composition is $C^{10}H^{8}$, being isomeric with oil of turpentine. Bitter orange-peel yields its aroma and taste to both water and alcohol. The leaves are aromatic and bitter, they are used on the Continent, but at present are not employed in this country.

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* See Treatise on Diseases of the Skin, Dublin, 1852.

ADULTERATIONS.—The rind of the sweet orange is often substituted for that of the bitter orange; it does not possess the peculiar aroma of the latter. The sophistication may be readily detected by the vesicles in which the volatile oil is contained being convex in the sweet and concave in the bitter orange.

THERAPEUTICAL EFFECTS.—Bitter orange peel and leaves are feebly tonic. They are employed in medicine principally for their agreeable flavour. The following preparations are officinal.

Infusum Aurantii compositum, D L. *Infusum Aurantii*, E. ("Take of bitter orange peel, dried, ʒiij.; cloves, bruised, ʒss.; boiling water, Oss.; infuse for half an hour, in a covered vessel, and strain. The product should measure about eight ounces," D. "Orange peel, dried, ℥ss.; lemon peel, ʒij.; cloves, bruised, ʒj.; boiling distilled water, Oj.; macerate for 15 minutes in a covered vessel, and strain," L. "Bitter orange-peel, dried, ℥ss.; lemon-peel, fresh, ʒij.; cloves, bruised, ʒj.; boiling water, Oj.; infuse for 15 minutes in a covered vessel and strain through linen or calico," E.) Dose, f℥j. to f℥ij.; chiefly used as a vehicle for other medicines.

Confectio Aurantii, L. *Conserva Aurantii*, E. ("Fresh orange-peel separated by a rasp, ℔j.; sugar, ℔iij.; bruise the rind with a wooden pestle in a stone mortar; then the sugar being added, again pound them until they are thoroughly incorporated," L. "Grate off the outer rind of bitter oranges, and beat it into a pulp, adding gradually thrice its weight of white sugar," E.) An agreeable flavouring adjunct to electuaries, syrups, &c.; it possesses stomachic and tonic properties. Dose, ʒij. to ℥j.

Syrupus Aurantii, D. L. E. ("Take of bitter orange peel, dried, ℥iiss.; boiling distilled water, Oj.; refined sugar, in powder, as much as is sufficient: infuse the orange peel in the water, in a covered vessel, for twelve hours, and strain without expression; then add to the liquor twice its weight of sugar, and dissolve it with the aid of a steam or water heat," D. "Dried orange peel, ℥iiss.; boiling distilled water, Oj.; sugar, ℔iij. or a sufficiency; rectified spirit, f℥iiss. or a sufficiency; macerate the peel in the water for 12 hours in a vessel lightly covered; express the liquor and boil for ten minutes; then filter and proceed as for syrup of Althæa," L. "Fresh bitter orange peel, ℥iiss.; boiling water, Oj.; pure sugar, ℔iij.; infuse the peel in the water for 12 hours in a covered vessel; pour off the liquor and filter it if necessary; add the sugar to the liquor, and dissolve with the aid of heat," E.) A mild stomachic, used for flavouring. It may be prepared extemporaneously by adding f℥j. of the tincture to Oj. of simple syrup. Dose, fʒij. to f℥ss. This syrup is scarcely so agreeable as that prepared with orange flowers, which may be made by adding a sufficiency of sugar to orange flower water, and dissolving.

Tinctura Aurantii, D. L. E. ("Bitter orange peel, dried, ℥iv.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Orange-peel, dried, ℥iiiss; proof spirit, Oij.; macerate for seven days, express, and filter," L. "Bitter orange-peel, dried, ℥iiiss; proof spirit, Oij; digest for seven days, strain and express strongly, and filter the liquor. This tincture may be made by percolation, by cutting the peel into small pieces, macerating it in a little of the spirit for 12 hours, and beating the mass into a coarse pulp before putting it into the percolator," E.) Dose, fʒj. to fʒiij.

INCOMPATIBLES.—The salts of iron; and lime water.

BARII CHLORIDUM, D. L. BARYTÆ MURIAS, E.—*Chloride of Barium. Muriate of Baryta.* This salt is retained in the Appendix to the last edition of the London Pharmacopœia merely as being used in testing.

PREPARATION.—"Take of carbonate of barytes, coarsely powdered, ℥x.; pure muriatic acid, f℥viij.; distilled water, as much as is sufficient. Dilute the acid with a pint and a half of the water, add the carbonate of barytes, and, when effervescence has ceased, evaporate to dryness. Transfer the residue to a Hessian crucible, and having exposed it to a low red heat for twenty minutes, suffer it to cool, then reduce it to a coarse powder, and boil it for ten minutes with a pint and a half of water. Pour off the solution, boil the undissolved residue with ten additional ounces of water, and again decant. Pass the decanted solutions through a paper filter, and having evaporated the resulting liquid to the bulk of about fourteen ounces, suffer it to cool, that crystals may be formed. The mother liquor, by further evaporation and cooling, will yield additional crystals. *Or*, Take of sulphate of barytes, ℔iss.; lamp-black, ℥iv.; pure muriatic acid, f℥xiv.; distilled water, a sufficient quantity. Heat the sulphate of barytes in a covered crucible, and, while red hot, throw it into distilled water. Let it now, after being reduced to a very fine powder in the manner directed in the formula for *Creta Præparata*, be mixed intimately with the lamp-black, and exposed in a Hessian crucible, for two hours to a strong red heat. The crucible being removed from the fire, and permitted to cool, its contents are to be reduced to a coarse powder, and boiled for fifteen minutes with two quarts of water, after which the solution is to be poured off on a paper filter. The undissolved residuum is to be again boiled with one quart of water, and the resulting liquor decanted on the same filter. To the filtered solutions, placed in a large capsule beneath a flue with a good draught, let the muriatic acid be gradually added, as long as it produces effervescence, and then, by means of a sand heat, evaporate to dryness. Boil the residuum with two quarts of water, pass the solution through a paper filter, and having evaporated it down to one quart, suffer it to cool that crystals may be formed. By further concentration the mother liquor will yield additional crystals," D. "Carbonate of baryta in fragments, ℥x.; pure muriatic acid, Oss.; distilled water, Oij.; mix the acid and water; add the carbonate by degrees; apply a gentle heat towards the close of the effervescence; and when the action is over, filter, concentrate, and set aside the solution to crystallize. *Or*, Sulphate of baryta, ℔j.; charcoal in fine powder, ℥ij.; pure muriatic acid, a sufficiency; heat the sulphate to redness; pulverize it finely when cold, and mix it intimately with the charcoal; subject the mixture to a low white heat for three hours in a covered crucible, pulverize the product, put it gradually into Ov. of boiling water, and boil for a few minutes; let it rest for a while over a vapour-bath; pour off the clear liquor, and filter it if necessary, keeping it hot. Pour Oiij. of boiling water over the residuum, and proceed as before. Unite the two liquors, and while they are still hot, or if cooled, after heating them again, add pure muriatic acid gradually so long as effervescence is occasioned. In this process the solutions ought to be as little exposed to the air as possible; and in the last step, the disengaged gas should be discharged by a proper tube into a chimney, or the ash-pit of a furnace. Strain the liquor, concentrate it, and set it aside to crystallize," E.

PHYSICAL PROPERTIES.—This salt crystallizes in flat four-sided tables of the rhombic prism series, bevelled at the edges. It is colourless and transparent; odourless; with an acrid, bitter taste. Specific gravity, 3·097.

CHEMICAL PROPERTIES.—Chloride of barium is composed of one equivalent of barium, one of chlorine, and two of water of crystallization, $Ba\,Cl + 2HO$. It is permanent in ordinary states of the atmosphere, but in very dry air effloresces slightly; is fused by a strong heat; is soluble in about twice its weight of temperate and in somewhat less of boiling water; and is said to be soluble in 400 parts of absolute alcohol. Sulphuric acid and the soluble sulphates produce a heavy white precipitate, insoluble in nitric acid, with a solution of this salt.

ADULTERATIONS.—As met with in the shops, this salt is very seldom adulterated. The Edinburgh College has given the following test, by which the freedom from any impurity may be readily ascertained:—" 100 grains in solution are not entirely precipitated by 100 grains of sulphate of magnesia."

THERAPEUTICAL EFFECTS.—Chloride of barium was at one time much employed in scrofulous diseases, and in chronic glandular enlargements, in consequence of its supposed tonic and deobstruent properties. In the present day it has fallen almost completely into disuse. In large doses (an ounce or more) it is a narcotico-acrid poison.

DOSE AND MODE OF ADMINISTRATION.—It is used only in solution.

Liquor Barii chloridi, D. L. *Solutio Barytæ muriatis*, E. ("Chloride of barium, ℥j.; distilled water, f℥viij.; dissolve and filter through paper; specific gravity, 1088," D. "Chloride of barium, ʒj.; distilled water, f℥j.; dissolve and filter," L. "Muriate of baryta, ʒj.; distilled water, f℥j.; dissolve the salt in the water," E.) Dose, min. v. to min. x. properly diluted. It is much employed as a test for detecting the presence of sulphuric acid and the sulphates.

INCOMPATIBLES.—Sulphuric acid; sulphates; carbonates; and phosphates.

In poisoning with this salt, the best antidotes are the soluble sulphates, as sulphate of magnesia or sulphate of soda.

BEBEERINÆ SULPHAS.—*Sulphate of Bebeerina.* Bebeerina is the active principle of BEBEERU, the bark of *Nectandra Rodiei*, the Green-heart tree of Demerara and of British Guiana, which belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Dodecandria Monogynia.* This principle is also found in much larger quantity in the fruit of the same tree.

PREPARATION.—The exact steps adopted in its preparation have not been published, but the process is similar to that followed for the preparation of sulphate of quina from cinchona bark.

PROPERTIES.—It occurs in small tabular, shining crystals, of a reddish-brown colour, void of odour, with a strongly astringent taste. According to Dr. Douglas Maclagan's analysis of the commercial salt, it is a basic sulphate, being composed of 90·83 of the base and 9·17 of sulphuric acid. It is soluble in water, but like sulphate of quina requires the addition of a few drops of dilute sulphuric acid for its complete solution. Bebeerina is an alkaloid, and combines with acids to form salts; the sulphate only has been as yet used in medicine. Its constitution is $C^{35} H^{20} O^{6} N$, (Maclagan and Tilly), being identical with that of morphia.

THERAPEUTICAL EFFECTS.—The introduction of this new medicine into the Materia Medica is altogether due to the researches of my friend Dr. Douglas Maclagan of Edinburgh. It is unquestionably a *tonic* of much power, and as an *antiperiodic* its effects are but little if at all inferior to those of sulphate of quina. From a report of numerous cases in which it has been employed, and which have been published by Dr. Maclagan in the 63rd vol. of the *Edinburgh Medical and Surgical Journal*, it appears to differ from that remedy "in not being so liable to excite the circulation or affect the nervous system;" and this conclusion is fully borne out by my own experience of its effects in some cases in which I have employed it.*

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to Gr. v. three or four times a day, made into pill with conserve of roses, or dissolved in water by means of a few drops of dilute sulphuric acid; ʒj. may be given as a febrifuge.

INCOMPATIBLES.—The alkalies, and their carbonates; lime water; tartaric acid; the soluble tartrates; and all vegetable tinctures, infusions and decoctions containing tannin.

BISMUTHI SUBNITRAS, D. BISMUTHI NITRAS, L. BISMUTHUM ALBUM, E.—*Subnitrate of Bismuth. Nitrate of Bismuth. White Bismuth. Magistery of Bismuth.*

PREPARATION.—"Take of bismuth, in small fragments, ℥ij; pure nitric acid, f℥iij.; distilled water, cong. j. Into the acid, first diluted with three ounces of the water, introduce the bismuth in successive portions, and having, when the spontaneous action has ceased, applied for ten minutes a heat approaching that of ebullition, decant the solution off any particles of metal which may remain undissolved. Evaporate the solution at a gentle heat until it is reduced to two fluid ounces, and then pour it into half a gallon of the water. When the precipitate which forms has subsided, decant the supernatant liquid, and agitate the sediment with the remainder of the water. After twelve hours, again decant, and, having placed the precipitate on a filter, dry it at a temperature of 212°, and reduce it to powder," D. "Bismuth, ℥j.; nitric acid, f℥iss.; distilled water, Oiij.; mix f℥j. of the water with the acid, and the bismuth being added apply heat until it is dissolved; then pour the solution into the remainder of the water, and strain through linen that the powder may be separated. Wash this with distilled water, and dry it with a gentle heat," L. "Bismuth, in fine powder, ℥j.; nitric acid (Dens. 1380), f℥iss.; water, Oiij.; add the metal gradually to the acid, favouring the action with a gentle heat, and adding a very little distilled water as soon as crystals or a white powder begin to form. When the solution is complete, pour the liquid into the water, collect the precipitate immediately on a calico filter, wash it quickly with cold water, and dry it in a dark place," E.

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* See Dublin Quarterly Journal of Medical Science, Vol. xvi., p. 202.

PHYSICAL PROPERTIES.—This salt is met with in the form of a heavy white crystalline powder with a pearly lustre, which appears under the microscope to be composed of transparent prisms. It is inodorous and tasteless. If not quite pure it becomes of a grayish colour when exposed to the light.

CHEMICAL PROPERTIES.—The composition of this substance has been variously stated; it is most generally believed to consist of 3 equivalents of oxide of bismuth, and 1 of nitric acid, ($3\ \mathrm{Bi\,O^3} + \mathrm{NO^5}$); but according to some recent researches of Buchner it appears to be $\mathrm{Bi\,O, NO^5} + 2\ \mathrm{Bi\,O, HO}$; while according to Wittstein it is $4\ \mathrm{Bi^2\,O^3} + 3\ \mathrm{NO^5} + 9\ \mathrm{HO}$. It is very insoluble in water, but is readily dissolved by nitric acid.

ADULTERATIONS.—As generally met with, this salt is tolerably free from impurities. It sometimes contains carbonates, which may be detected by the effervescence produced when the powder is dissolved in nitric acid; and in France M. Lassaigne has recently indicated the presence of arsenic in the powder, in such minute quantities however as to have no effect in the small doses in which white bismuth is usually prescribed in this country: it may be detected by first acting on the preparation with *pure* sulphuric acid in a porcelain capsule, evaporating to dryness and testing the residue in Marsh's apparatus. The following are the tests of the London College for its purity:—"Soluble in nitric acid without effervescence: dilute sulphuric acid does not precipitate with it."

THERAPEUTICAL EFFECTS.—In large doses nitrate of bismuth has acted as an irritant poison, causing inflammation of the stomach and intestines; and a case is on record in which ʒij. produced symptoms of poisoning, but this most probably resulted from the arsenical impurity above indicated, for M. Monneret has recently given it in very large doses from ʒij. to ʒvj. daily without the production of any ill effects. Accounts vary much as to its medicinal action; according to some practitioners in small doses from five to six grains three times daily, it acts with much certainty in painful derangements of the stomach; others state that to prove beneficial it must be given in at least scruple doses; while Monneret always commences its administration in such doses that two drachms are taken in the course of the day, and the quantity is rapidly augmented until six or eight drachms constitute the daily dose. The beneficial results derived from its use in these affections have been generally ascribed to its tonic properties; more recently, however, they are said to be owing to a peculiar sedative action which it exerts on the nerves of the stomach. The forms of dyspepsia in which alone it proves serviceable, are those chronic affections attended with much pain, but unaccompanied by organic disease. It has been also employed in chlorotic dyspepsia and in diarrhœa, especially the colliquative diarrhœa of phthisis. My own experience of its use is not at all favourable, and surely there must be some uncertainty as regards the action of a medicine the dose of which as exhibited by different practitioners, varies so much. Applied externally in the form of powder, white bismuth allays irritation and itching in cutaneous diseases; it should be diluted with an equal quantity of starch in fine powder; and in cases attended with much discharge as in some forms of chronic eczema, oxide of zinc and carbonate of lead may be combined with it with much advantage.

DOSE AND MODE OF ADMINISTRATION.—For dose see last paragraph. It may be made into an electuary or bolus, with some aromatic powder and syrup, or honey; Monneret recommends the dose to be taken during meals, and he usually gives it in broth or milk.

INCOMPATIBLES.—Potash, soda, ammonia, and their carbonates.

CALCII CHLORIDUM, D. L. CALCIS MURIAS, E.—*Chloride of Calcium. Muriate of Lime. Hydrochlorate of Lime.*

PREPARATION.—An article of the Materia Medica in the last edition of the London Pharmacopœia. "Take of chalk, in small fragments, ℔ij.; pure muriatic acid, Oiiss.; distilled water, Oj.; slaked lime as much as is sufficient: into the acid, first diluted with water, introduce the chalk in successive portions, and when the effervescence has ceased, boil for ten minutes. Add now, stirring well, a very slight excess of slaked lime, and throw the whole upon a calico filter. Acidulate the filtered solution slightly by adding a few drops of muriatic acid, then evaporate it to dryness, and expose the residuum to a low red heat in a Hessian crucible. Finally, reduce the product rapidly to a coarse powder in a warm mortar, and enclose it in a well-stopped bottle," D. "White marble, in fragments, ℥x.; muriatic acid of commerce; and water, of each, Oj.; mix the acid and water; add the marble, by degrees, and when the effervescence is over, add a little marble in fine powder till the liquid no longer reddens litmus; filter and concentrate to one-half; put the remaining fluid in a cold place to crystallize; preserve the crystals in a well closed bottle; more crystals will be obtained on concentrating the mother liquor," E.

PHYSICAL PROPERTIES.—This salt is usually met with in colourless translucent masses, but it crystallizes from a concentrated solution in long striated four and six sided prisms. It is inodorous, and has an acrid, bitter, saline taste.

CHEMICAL PROPERTIES.—Crystallized chloride of calcium is composed of one equivalent of calcium, one of chlorine, and six of water of crystallization, $Ca\,Cl + 6\,HO$. Exposed to the air it deliquesces rapidly. It is very soluble in water and in alcohol; by heat the water of crystallization is driven off, and at a red heat it fuses.

ADULTERATIONS.—This salt should be perfectly colourless, the presence of iron, with which it is occasionally contaminated, giving it a yellowish tinge. The adulteration with magnesia may be detected by ammonia giving a white precipitate with a solution of the salt. In the following test the Edinburgh College has guarded against any alkaline impurity:—"A solution of 76 grains in f℥j. of distilled water, precipitated by 49 grains of oxalate of ammonia, remains precipitable by more of the test."

THERAPEUTICAL EFFECTS.—Chloride of calcium acts as an irritant poison in large doses. In medicine, it was at one time much employed in the treatment of bronchocele and in scrofulous diseases, being given internally, and at the same time used externally dissolved in water in the form of bath; its action was said by some to be tonic and deobstruent, by others cathartic. In the present day, however, it has nearly fallen into disuse, although lately proposed as a remedy for lupus. This salt forms a principal ingredient in many mineral waters.

DOSE AND MODE OF ADMINISTRATION.—Chloride of calcium is always administered in solution; the following is a convenient formula:—

Liquor Calcii Chloridi, D. *Calcis Muriatis solutio,* E. ("Chloride of calcium, ℥iij.; distilled water, f℥xij.; dissolve the salt in the water, and filter through paper. Specific gravity, 1225," D. "Muriate of lime, ℥viij.; water, f℥xij.; dissolve the salt in the water," E.) Dose, min. xxx. to fʒij. diluted with water. The Edinburgh preparation is twice and a half as strong as that of Dublin.

INCOMPATIBLES.—Sulphuric acid, and the soluble sulphates; potash and soda, and their carbonates; and carbonate of ammonia.

CALUMBA, D. L. E.—*Calumba. Root of Cocculus palmatus.* A native of the forests of Mozambique and Oibo in Africa; belonging to the Natural family *Menispermaceæ,* and to the Linnæan class and order *Diœcia Hexandria.*

BOTANICAL CHARACTERS.—An annual climber; Root, perennial, tuberose; Stem, herbaceous; Leaves, alternate, cordate at the base, 5–7 lobed, somewhat hairy; Flowers, diœcious, small, green, in axillary racemes; Fruit, a drupe or berry, one-celled, one-seeded.

PREPARATION.—The roots are dug up in March, cut horizontally into slices, and dried in the shade; the offsets or tubers from the main root only are used.

PHYSICAL PROPERTIES.—As met with in commerce, calumba root is in circular flat pieces, from 3 to 10 lines thick, and from half an inch to three inches in diameter. The pieces consist of a brownish-yellow rugous epidermis, a thick yellowish inner-bark, and a light, spongy, woody centre, of a grayish-yellow colour. The flat surfaces are depressed in the centre, and marked with concentric yellowish lines. It has a feeble, somewhat aromatic odour, and a strong purely bitter taste.

CHEMICAL PROPERTIES.—Calumba contains a crystalline, very bitter neutral principle, which has been named *Calumbin,* and on which its medicinal properties depend, about a third of its weight of starch, a trace of volatile oil, gum, wax, &c. Its bitter principle is dissolved by cold and boiling water, by alcohol, and by ether. As boiling water dissolves out some starch also, a warm infusion becomes cloudy as it cools; the Dublin and Edinburgh Colleges therefore employ cold water for preparing the officinal infusion, a great improvement, inasmuch as the active principle is as completely extracted and the resulting infusion is quite transparent.

ADULTERATIONS.—The root of a species of Bryony (*Bryonia epigæa*), and the root of *Frasera walteri* (American or false calumba), have been at times sold for the true calumba root. The former may be at once detected by its disagreeable, bitter, somewhat acrid taste, the latter by its infusion becoming dark-green on the addition of a sesqui-salt of iron, an infusion of the true root remaining unchanged by the same test. Another false calumba is met with in the French drug market, which is known by its containing no starch, a cooled decoction not being affected by tincture of iodine.

THERAPEUTICAL EFFECTS.—Calumba is an excellent bitter tonic, being slightly aromatic, but free of all astringency. It is most usefully employed in the various forms of dyspepsia, depending on want of tone in the digestive organs, and in irritability of the stomach accompanied by vomiting, when there is no tendency to inflammation present; for this latter affection it is peculiarly adapted in consequence of its property of arresting vomiting, whether it be the consequence of disease or of the administration of emetics. It is also used with much benefit to allay the sympathetic vomiting of pregnancy, and that which depends on diseases of the other abdominal viscera. The *anti-emetic* property of calumba probably depends on its active principle *calumbin*, which, in addition to its action as a bitter, possesses also narcotic properties. In the advanced stages of diarrhœa and dysentery, when the use of tonics is indicated, calumba is an excellent remedy.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.

Infusum Calumbæ, D. L. E. ("Take of calumba root, in coarse powder, ʒiij.; *cold* water, f℥ix. Macerate for two hours, and strain. The produce should measure eight ounces," D. "Calumba, sliced, ʒv.; boiling distilled water, Oj.; macerate for two hours in a lightly covered vessel and strain," L. "Calumba, in coarse powder, ℥ss.; cold water, about a pint; triturate the calumba with a little water so as to moisten it thoroughly, put it into a percolator, and transmit cold water till f℥xvj. of infusion be obtained," E.) For the reasons before stated, the Dublin and Edinburgh preparations are to be preferred. Infusion of calumba is usually employed as a vehicle for the more active tonics, and is given in doses of from f℥j. to f℥iij. The salts of iron, the alkalies, and their carbonates do not alter the colour of this infusion, and consequently may be advantageously combined with it in prescription.

Tinctura Calumbæ, D. L. E. ("Calumba root, in coarse powder, ℥v.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Calumba, sliced thin, ℥iij.; proof spirit, Oij.; macerate for seven days, express and filter," L. "Calumba, in small fragments (if by percolation in moderately fine powder), ℥iij.; proof spirit, Oij.; digest for 7 days; pour off the clear liquor, express the residuum strongly and filter the liquors. This tincture is much more conveniently prepared by the process of percolation, allowing the powder to be soaked with a little of the spirit for six hours before putting it into the percolator," E.) Dose, fʒj. to fʒij.

Extractum Calumbæ, BAVARIAN PHARMACOPŒIA. (Calumba, sliced, 1 part ; rectified spirit, 6 parts ; digest for 2 hours at a temperature of from 86° to 104° F., and then express ; pour upon the residue 2 parts of rectified spirit, digest and express as before ; mix the two liquors, distil off the spirit, and evaporate to a due consistence.) This is an excellent tonic extract and should be contained in the British Pharmacopœias. I have used it for many years with excellent effect. Dose, gr. v. to gr. xx.

INCOMPATIBLES.—Tincture of iodine ; nitrate of silver ; and the acetates of lead.

CANELLA, L. E. CANELLA ALBA, CORTEX, D.—*Canella bark, Bark of Canella alba.* This, the *White Wood* or *Wild Cinnamon* tree of the West Indian islands and of South America, belongs to the Natural family *Meliaceæ (Canellaceæ,* Lindley), and to the Linnæan class and order *Dodecandria Monogynia.*

BOTANICAL CHARACTERS.—A handsome tree, 40–50 feet high ; Leaves, alternate, obovate, shining, coriaceous ; Flowers, small, glaucous blue, in clusters at the extremities of the branches ; Fruit, a small, bluish-black berry, generally one-celled.

PHYSICAL PROPERTIES.—Canella bark is met with in pieces of from 3–12 inches long, generally quilled, and from one to three lines thick. They are of a yellowish or pinkish-white colour, have a faint aromatic odour, and an acrid very spicy taste. This bark is often called *false Winter's bark,* as it is frequently sold for the bark of *Drymis winteri,* which was formerly officinal in the Dublin Pharmacopœia.

CHEMICAL PROPERTIES.—The medicinal activity of canella bark is due to volatile oil and bitter extractive ; it also contains a peculiar crystalline principle resembling *mannite* in its properties, and which has been named *Canellin.*

THERAPEUTICAL EFFECTS.—Canella is an aromatic tonic of some power ; it is seldom employed alone in this country, but is used as an adjunct to the bitter tonics in dyspepsia. It is also combined with cathartics in debilitated states of the digestive organs, and to correct their griping qualities. Dose, in powder, gr. x. to ʒss. It enters into the composition of the *Vinum Aloes,* L., and of the *Tinctura* and *Vinum Gentianæ,* E.

CASCARILLA, D. L. E.—*Cascarilla bark. Bark of Croton eleuteria,* D. L. *Bark, probably of Croton eleuteria and possibly of other species of the same genus,* E. Croton eleuteria is a native of the Bahamas, being found chiefly on the island of Eleuthera, whence its specific name; it belongs to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monadelphia*.

BOTANICAL CHARACTERS.—A moderate sized tree; Branches, angular, somewhat compressed; Leaves, alternate, ovate, smooth, silvery beneath; Flowers, whitish, monœcious, in compound axillary racemes.

PHYSICAL PROPERTIES.—Cascarilla bark occurs in short broken quills or flattened pieces, generally somewhat twisted. It is of a reddish-brown colour, with a whitish or reddish-yellow fissured epidermis; hard, breaking with a close compact fracture; has an aromatic, bitter taste, and a peculiar agreeable odour, which becomes very fragrant when the bark is burned.

CHEMICAL PROPERTIES.—According to the analysis of Duval, this bark contains a bitter, crystalline, neutral principle, which has been named *Cascarillin*, a peculiar form of tannin, albumen, a red colouring matter, fatty matter, wax, gum, odorous volatile oil, resin, starch, pectic acid, salts of lime and potash, and woody fibre. It yields its active properties to both water and alcohol; the colour of the infusion is deepened by the sesqui-salts of iron.

ADULTERATIONS.—Copalchi bark, obtained from the *Croton pseudo-china*, a native of Mexico, has been occasionally substituted in commerce for cascarilla bark, which it resembles much both in odour and properties. The quills are much longer than those of cascarilla bark, more completely covered with minute white lichens, and have no transverse cracks.

THERAPEUTICAL EFFECTS.—Cascarilla is an aromatic tonic, possessing but little astringency. It is principally used as an agreeable addition to other remedies of this class in atonic dyspepsia, in the advanced stages of diarrhœa and dysentery, and in convalescence from fevers or other acute diseases. It has been also employed in intermittents as a substitute for cinchona bark, and it is stated with great success; but this probably has arisen from its being confounded with a species of cinchona which is named Cascarilla.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ℈ij.

Infusum Cascarillæ, D. L. E. ("Cascarilla bark, in coarse powder, ℥j.; boiling water, Oss.; infuse for one hour in a covered vessel, and strain; the product should measure about f℥viij.," D. "Cascarilla, bruised, ʒiss.; boiling distilled water, Oj.; macerate for two hours in a lightly covered vessel and strain," L. "Cascarilla, bruised, ℥iss.; boiling water, Oj.; infuse for two hours in a covered vessel and strain through linen or calico," E.) Dose, f℥j. to f℥ij. An agreeable vehicle for more active medicines.

Tinctura Cascarillæ, D. L. E. (Cascarilla bark, in coarse powder, ℥v.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Cascarilla bruised, ℥v.; proof spirit, Oij.; macerate for seven days, express and filter," L. "Cascarilla, in moderately fine powder, ℥v.; proof spirit, Oij.; proceed by percolation or digestion as directed for the tincture of cinchona," E.) Dose, fʒj. to f℥ss.

INCOMPATIBLES.—Lime-water; salt of iron; sulphate of zinc; tartar emetic; nitrate of silver; and acetate of lead.

CENTAURIUM, E.—*Common Centaury. The flowering heads of Erythræa centaurium.* Indigenous; belonging to the Natural family *Gentianaceæ,* and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Annual, 8–10 inches high; Stem, nearly simple; Leaves, ovato-oblong, in distant pairs; Flowers, handsome, rose-coloured, in corymbose panicles near the top of the stem.

The whole of this plant is odourless, but has a strong purely bitter taste. It should be collected when in flower, and dried with a stove heat; every part except the flowers contains bitter extractive, the Edinburgh College is therefore incorrect in directing the flowering heads to be used. It imparts its properties, which depend on the bitter extractive, to boiling water. The common centaury is scarcely ever used in the present day, except as a domestic remedy; nevertheless, although omitted from the last editions of the Dublin and London Pharmacopœias it forms an excellent indigenous substitute for gentian. It is best given in the form of infusion (prepared with ℥ss. of the dried herb, and f℥xij. of boiling water), in doses of f℥j. or f℥ij.

CETRARIA, L. E. CETRARIA ISLANDICA, D.—*Liverwort. Iceland-moss.* Cetraria islandica is a native of the northern parts of the British Isles, and of the colder regions of both the New and Old Worlds. It belongs to the Natural family *Lichenaceæ (Lichenales,* Lindley,) and to the Linnæan class and order *Cryptogamia Algæ.*

BOTANICAL CHARACTERS.—*Thallus* foliaceous, erect, tufted, laciniated, channelled, dentato-ciliate; *Apothecia*, brown, appressed, flat, with an elevated border.

PHYSICAL PROPERTIES.—As met with in the shops, Iceland moss is grayish or brownish-white, silvery, with a faint peculiar odour, and a mucilaginous, somewhat bitter taste.

CHEMICAL PROPERTIES.—It consists of two starchy matters *(lichenin* and *inulin,)* a bitter principle *(cetrarin,)* two acids *(lichestearic and lichenic acids,)* with uncrystallizable sugar, gum, extractive, colouring matter *(Chlorothalle,)* some salts, and amylaceous fibre. By maceration in cold water, the bitter principle is extracted, and the water acquires a brownish colour. On boiling in water about 65 per cent. is dissolved, and when sufficiently concentrated, the liquid cools into a firm jelly.

THERAPEUTICAL EFFECTS.—Iceland moss is a mild bitter tonic, and as it is also nutritive, forms an excellent article of diet in diseases of debility, and in convalescence from acute diseases. It is used also as an article of food, the bitter principle having been previously removed by maceration in cold water or in a weak alkaline ley (water, 300 parts, and carbonate of potash 1 part ;) but when its tonic powers are required, the bitter principle should not be removed, as is frequently done.—*Cetrarin* is the tonic principle of Iceland moss, it has been obtained in a separate state by the process described below, and has been used in Italy with much success as a substitute for sulphate of quina.

DOSE AND MODE OF ADMINISTRATION.—As follows :—

Decoctum Lichenis islandici, D. *Decoctum Cetrariæ,* L. ("Iceland moss, ℥j. ; boiling water, Oiss. ; wash the moss in cold water to remove impurities, then boil it for ten minutes in a covered vessel, and strain while hot. The product should measure about a pint," D. "Iceland moss, ʒv. ; distilled water, Oiss. ; boil down to Oj. ; and strain," L.) Dose, f℥j. to f℥iv.

Cetrarin, (Iceland moss, coarsely powdered, any quantity ; digest in rectified spirit as long as it acquires a bitter taste ; distil off the greater part of the spirit and filter while hot. The impure cetraric acid which is deposited as the liquor cools, may be purified by redissolving in boiling alcohol and crystallizing.) Dose as a febrifuge, gr. ij. to gr. v. every three hours. Sixteen grains thus given in divided doses, are said to be sufficient to check the return of the fit in ague.

INCOMPATIBLES.—Potash ; the salts of lead and of copper ; the sesquisalts of iron ; and iodine.

CHIRETTA, D. E.—*Chiretta or Chirayta. The herb* (*and root,* E.) *of Agathotes chirayta* (*Ophelia chirata,* Griesbach.) A native of the northern parts of the continent of India ; belonging to the Natural family *Gentianaceæ,* and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Annual ; Stems, smooth, jointed, branched, erect, about 3 feet high ; Leaves, opposite, amplexicaul, very acute ; Flowers, yellow, very numerous, stalked, in terminal panicles.

PREPARATION.—The whole plant is pulled up at the time the flowers begin to decay, and dried in the sun for use. It is imported in bundles tied with strips of cane, and packed in large chests.

PHYSICAL PROPERTIES.—As met with in the shops, chiretta consists of the root, stems, and branches. The stems are round and smooth, about the thickness of a writing pen, with a shining brown epidermis, and a yellow spongy pith. The whole plant has a purely bitter and unpleasant taste, without any astringency.

CHEMICAL PROPERTIES.—Chiretta is composed of resin, yellow bitter matter, brown colouring matter, gum, malic acid, salts of potash and lime, and traces of oxide of iron, (*Lassaigne* and *Boissel.*) It yields its bitterness to water and to alcohol.

ADULTERATIONS.—Bundles of another plant bearing some resemblance to chiretta, are sometimes found mixed with it in the chests in which it is brought to this country; they may be, however, readily detected, as they do not possess the least bitter taste.

THERAPEUTICAL EFFECTS.—Chiretta is a powerful, purely bitter tonic, bearing much resemblance to gentian. Under its use the bowels are relaxed and the secretion of bile promoted; it is therefore peculiarly adapted as a tonic for dyspepsia accompanied by constipation. It is much employed in the East, where its febrifugal properties are held in high estimation by the European practitioners who use it instead of cinchona when the latter is not to be procured.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form, gr. x. to gr. xx.

Infusum Chirettæ, D. E. (Take of chiretta, bruised, ʒij.; boiling water, f℥ixss.; infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces," D. "Chiretta, ʒiv.; boiling water, Oj.; infuse for two hours and strain through linen or calico," E.) This infusion would be better prepared by using double the quantity of chiretta, and employing cold water. Dose, f℥j. to f℥ij.

Tinctura Chirettæ, D. (Take of chiretta, bruised, ℥v.; proof spirit, Oij.; macerate for fourteen days, strain, express, and filter.) Dose, fʒj. to fʒij.

CHONDRUS CRISPUS.—*Carragheen, or Irish moss.* This substance consists of this and many allied species, dried and bleached in the sun. For medical use it is principally gathered by the peasantry on the south-west coast of Ireland. As commonly met with it is of a yellowish-white colour, dry and very crisp; in most of its properties resembling Iceland moss, but being more mucilaginous and less bitter. It forms a somewhat similar jelly with boiling water or milk, and is frequently used as a substitute for that substance. Dr. Frank, of Wolfenbuettel, recommends the following compound powder of Irish moss as a diet for phthisical patients, and for children affected with *tabes mesenterica*:—Take of carragheen moss, cleaned, ʒss.; spring water, f℥xvj.; boil down to one-half, strain with expression, and add to the strained liquor, white sugar, ℥iv.; gum arabic, powdered, ℥j.; and powdered orris-root, ʒss.; heat to dryness with a gentle temperature, stirring constantly so as to obtain a pulverulent mass, to which ℥iij. of arrowroot are to be added with trituration. A jelly is prepared with this powder, by rubbing a teaspoonful of it with a little cold water, and then pouring a cupful of boiling water on it. It has a most agreeable odour and taste, and is highly nutritious.

CINCHONA FLAVA, D. L E.—*Yellow Cinchona Bark. Bark of an unascertained species of Cinchona,* D. E. *Bark of Cinchona calisaya* (Weddell), L.

CINCHONA RUBRA, D. L. E.—*Red Cinchona Bark. Bark of an unascertained species of Cinchona,* D. L. E.

CINCHONA CONDAMINEA, D. CINCHONA PALLIDA, L. CINCHONA CORONÆ, E.—*Pale Cinchona Bark. Crown or Loxa Bark. Bark of Cinchona condaminea,* D. L. E.

CINCHONA MICRANTHA, D. CINCHONA CINEREA, E.—*Gray or Huanaco Bark. Silver Bark. Bark of Cinchona micrantha.*

A great deal of confusion, which so long existed regarding the natural history of the Cinchona barks, has been cleared up by the recent investigations of Weddell in their native country; a full account of which, and of all else relating to so important a medicine, is contained in the third edition of Pereira's great book,—an account complete and comprehensive up to the time, moreover possessing for the student of the Materia Medica a melancholy interest, as being the last portion of the work which the author was spared to emend. All the cinchona trees are inhabitants of the Andes, growing at different elevations from 3,937 to 10,728 feet above the level of the sea, and in the region extending from 10° N. to 19° S. latitude. They belong to the Natural family *Cinchonaceæ,* and to the Linnæan class and order *Pentandria Monogynia.*

BOTANICAL CHARACTERS.—Trees or tall shrubs; Leaves, shortly petioled with plain margins; Stipules, ovate or oblong, foliaceous, free, deciduous; Flowers, white or rose-coloured, in terminal corymbose panicles, very fragrant; Stamens, included within the tube of the corolla; Capsule, ovate, elongated, crowned with the teeth of the calyx, 2–celled, 2–valved, containing many winged seeds.

PREPARATION.—Bark-peeling, as it is termed in South America, is practised by the native Indians; the bark of the entire tree both stem and branches is removed, the trees being in general previously cut down; it is then dried with great care so as to preserve its bright colour, the larger and thicker portions being dried so as to form flat pieces, the smaller being allowed to curl into quills. The epidermis with the lichens, which naturally grow on it, is carefully preserved on the bark, but if it be very coarse or injured it is frequently removed. Bark-peeling occupies the entire of the dry season from May to November.

PHYSICAL PROPERTIES.—It would be quite foreign to the scope of this work to enter into any detailed account of the numerous varieties of cinchona bark which are occasionally met with in commerce. I shall only describe those which most frequently occur, and which are most generally used for medical purposes; and in so doing I shall adopt the classification generally followed in the English drug trade, and now adopted in the Pharmacopœias:—namely, *Yellow, Red, and Pale Cinchona barks.*

1st.—YELLOW BARK, *Cinchona flava.* The botanical origin of this bark as above remarked, the *China regia* of Von Bergen, the *Jaune royal* of Guibourt, is ascribed by Weddell, who investigated the history of Cinchona barks in their native country, to the *Cinchona calisaya.* It is met with in two varieties, *quilled* and *flat.* The *quills* are generally from 9 to 18 inches long, from half an inch to two inches in diameter, and from one to six or seven lines in thickness. They are for the most part singly quilled, and coated with a very rough light-gray epidermis; externally they are marked with longitudinal wrinkles, and traversed with horizontal fissures often extending completely round the quills; and large patches of grayish-white lichens are usually adherent. Internally, they are smooth and of a cinnamon-brown colour. The *flat* pieces are from 8 to 18 inches long, from one to four inches broad, and from one to five lines thick; they are in general freed of their epidermis, but when present it is similar to that of the quilled bark. The colour is reddish-brown externally and cinnamon-brown within. Both sorts break with a fibrous, splintery fracture, and yield an orange-yellow powder. They have a faint aromatic odour, and an aromatic, bitter, somewhat astringent taste. An account of the cryptogamic plants which are found on this and the other sorts of cinchona bark has been given by Fèe and by Zenker, and an attempt made to distinguish the different barks according to the species which predominate on each, but it is much too refined and difficult for practical purposes; and moreover Weddell states that the presence of peculiar varieties of the cryptogamia on the barks depends on the district in which the trees grow and not on the species of Cinchona. The yellow bark of commerce is imported in serons and chests from Arica, a seaport of Bolivia. The following are the characters of this bark given in the last edition of the London Pharmacopœia:—"Thick, covered for the most part with very thin sharp fibres; flat or quilled; gray or brownish on the outer side, rugose longitudinally, split transversely or all round with deep fissures; it is sometimes denuded of bark and of a cinnamon-brown colour; very bitter to the taste; about three drachms of disulphate of quina should be procured from one pound of this bark by means of sulphuric acid."

2nd—RED BARK, *Cinchona rubra.* The species from which this bark, the *China rubra* of Von Bergen, the *Quinquina rouge verruqueux et non-verruqueux* of Guibourt, is obtained is as yet not certainly ascertained. Guibourt is inclined to ascribe it to *Cinchona nitida* or a variety of that species, but Mr. Eliot Howard, in an interesting memoir published in the 16th volume of the Pharmaceutical Journal, is of opinion from observations made by him on specimens received from the place of growth, that it is procured from a variety of the *Cinchona ovata,* and to which he suggests the specific name *erythroderma* originally proposed by Guibourt should be applied. Weddell has since endorsed this opinion, but M. Guibourt does not agree in it. It occurs in quills and in flat pieces. The *quills* are from 3 to 15 inches long, from two lines to an inch and a quarter in diameter, and from half a line to two lines thick. Externally, they are of a reddish-brown colour,—the smaller quills are grayish-brown; they are usually rough, wrinkled, and furrowed; and have a few scattered patches of grayish-white lichens. The *flat* pieces are from two inches to two feet in length, from one to five inches in breadth, and from a third of an inch to three quarters of an inch in thickness; they are seldom quite flat, being generally somewhat convex. The epidermis is usually absent, it is of a reddish or chesnut-brown colour, rough, wrinkled, and generally warty. The inner surface of both sorts is fibrous, and of a reddish-yellow or reddish-brown colour, the thickest pieces being the darkest coloured. The transverse fracture is fibrous and splintery, and the powder is pale reddish-brown. Red bark has a feebly aromatic, somewhat earthy odour, and a bitter, strongly astringent taste. It is imported from Guayaquil and Lima in chests, never in serons; good red bark is now scarce in the English market, and does not occur in as large pieces as it formerly did; when met with genuine it is much esteemed and bears a high price. The following are the characters of this bark, given in the last edition of the London Pharmacopœia:—"Thick, either flat or in quills; rough on the outer surface, being wrinkled, furrowed, or warty; reddish or of a chesnut-brown colour; having a bitter taste."

3rd—PALE BARK, *Cinchona coronæ*, E. This bark (*Crown or Loxa bark*, D.), the *China loxa* of Von Bergen, *Quinquina de Loxa* of Guibourt, is the produce of the Cinchona condaminea of Humboldt and Bonplandt. It is always met with in the form of quills, never in flat pieces. These quills are single or double, from six to fifteen inches long, from two lines to an inch in diameter, and from one-fourth of a line to two lines thick. The epidermis is always present, it is furrowed with numerous transverse fissures or cracks; and frequently also with longitudinal splits. Externally the bark is of a pale grayish-brown colour, and covered with a great number of small whitish and ash-coloured lichens. Internally it is smooth and of a pale cinnamon-brown colour; its fracture is fibrous, and it yields a paler coloured powder than either yellow or red bark. The odour and taste are nearly similar to those of red bark. The fourth variety of bark which is officinal in the Dublin and Edinburgh Pharmacopœias is also a pale bark, and whenever met with, at least in the Dublin market, is sold under that name; it is rather scarce at present, but is a very good bark; it may be readily distinguished from other barks by the edges of the most perfect quills being cut obliquely; it is the produce of *Cinchona micrantha*. Both these varieties of pale bark are imported from Loxa and Lima in chests and in serons, and are often mixed together in the same package. The following are the characters of pale bark given in the last edition of the London Pharmacopœia:—"Thin, quilled; the outer surface brown, often covered with lichens; split with many transverse cracks, which sometimes pass all round; of a cinnamon-brown colour on the inner surface; taste astringent and bitter."

Several other varieties of cinchona bark, although not officinal, are frequently met with in commerce, and are many of them of good quality; a detailed account of them will be found in the works of Pereira, of Christison, of Guibourt, and of Weddell. The so-called *false cinchona barks* will be considered under the head of *adulterations*.

CHEMICAL PROPERTIES.—According to the analyses of various chemists, more especially those of Pelletier and Caventou, cinchona bark appears to consist of four peculiar alkaloids—*quina, cinchonia, quinidina,* and *aricina* or *cuzconia,* in combination with three acids—*kinic* or *cinchonic, kinovic* and *tannic,* together with two peculiar colouring matters—*cinchonic red* and *cinchonic yellow,* green fatty matter, kinate of lime, starch, gum, ligneous fibre, and a trace of volatile oil. The proportion of these ingredients, particularly the alkaloids—the last of which has not been used in medicine, differs remarkably in the various kinds of bark; thus *quina* predominates in yellow bark, and *cinchonia* in pale bark, while they are contained in nearly equal proportions in red bark: *quinidina* has been found in the brown and gray barks only. The medical properties of bark depend principally on the alkaloids quina, quinidina and cinchonia, of these the first is most active. A salt of it, the disulphate, is in very general use as a substitute for cinchona bark; and is officinal in the three British Pharmacopœias, being prepared as follows:—

QUINÆ SULPHAS, D. E. QUINÆ DISULPHAS, L.—An article of the Materia Medica in the London Pharmacopœia. "Take of yellow bark, in powder, ℔j.; water, cong. iss.; oil of vitriol of commerce, f℥ss.; rectified spirit, Oiij.; slaked lime, ℥j.; animal charcoal, ℥ss.; dilute sulphuric acid, f℥ss.; or a sufficient quantity. Macerate the bark for twenty-four hours with half a gallon of the water, acidulated with two drachms of the oil of vitriol, then boil for half an hour, and decant. Boil the residue with a second half gallon of the water, acidulated with one drachm of the oil of vitriol, and again decant, and let this process be a third time performed with the rest of the water, and the residual drachm of oil of vitriol. Let the decanted liquors be evaporated to the bulk of one quart, and filtered through calico when cold, and to the solution thus obtained add the lime, until the mixture becomes decidedly alkaline. The precipitate, collected on a calico filter, is to be washed with about a pint of cold water, and when partially dried on porous bricks, to be enveloped in blotting-paper, and subjected to a powerful pressure. The pressed mass must now be introduced into a flask containing a pint of the spirit, which is to be raised to and maintained at the temperature of ebullition for twenty minutes, and then, after the subsidence of the insoluble matter, decanted. This process having been repeated successively with the second and third pints of spirit, and the undissolved residuum having been subjected to expression, let the decanted and expressed liquors be cleared by passing them through a paper filter, and then subjected to distillation, so as to recover the entire of the spirit. The brown viscid mass which remains is now to be mixed with sixteen ounces of water, and this being raised to the boiling point, the dilute sulphuric acid must be added, so as to produce a neutral or very slightly acid solution. Add now the animal charcoal, boil for five minutes, filter, and set to cool, in order that crystals may be formed, which are to be dried on blotting paper by mere exposure to the atmosphere. The liquor decanted from the crystals will, by further concentration and cooling, yield an additional product," D. "Yellow bark, in coarse powder, ℔j.; carbonate of soda, ℥viij.; sulphuric acid, f℥ss.; purified animal charcoal, ʒij.; boil the bark for an hour in Oiv. of water, in which half the carbonate of soda has been dissolved; strain and express strongly through linen or calico; moisten the residuum with water and express again; and repeat this twice. Boil the residuum for half an hour with Oiv. of water and half the sulphuric acid; strain, express strongly, moisten with water, and express again. Boil the residuum with Oiij. of water, and a fourth part of the acid; strain and squeeze as before. Boil again the residuum with the same quantity of water and acid, strain and squeeze as formerly. Concentrate the whole acid liquids to about a pint; let the product cool; filter it; and dissolve in it the remainder of the carbonate of soda. Collect the impure quina on a cloth, wash it slightly, and squeeze out the liquor with the hand. Break down the moist precipitate in Oj. of distilled water, add nearly f℈j. of sulphuric acid, heat it to 212°, and stir occasionally. Should any precipitate retain its gray colour, and the liquid be neutral, add sulphuric acid, drop by drop, stirring constantly till the grey colour disappears. Should the liquid redden litmus, neutralize it with a little carbonate of soda. Should crystals form on the surface, add boiling distilled water to dissolve them. Filter through paper, preserving the funnel hot, set the liquid aside to crystallize; collect and squeeze the crystals; dissolve them in Oj. of distilled water heated to 212°; digest the solution for 15 minutes with the animal charcoal, filter, and crystallize as before. Dry the crystals with a heat not exceeding 140°. The mother liquors of each crystallization will yield a little more salt by concentration and cooling," E.

The quantity of *disulphate of quina* obtained from yellow-bark varies with the quality of the bark, the average may be stated to be from 1½ to 3 per cent. It occurs in very fine, needle-like, silky, flexible crystals of a perfectly white colour; they are inodorous, and have a very bitter taste. Exposed to the air they effloresce slightly; by a moderate heat they are fused, and by a red heat are decomposed. Sulphate of quina requires for its solution 740 parts of cold, but only 30 of boiling water, possessing the peculiar property of giving a blue tinge to the surface of the water; it is soluble in 80 parts of cold alcohol (specific gravity, ·850), and in much less of boiling alcohol; it is very soluble in diluted sulphuric acid. This salt is composed of 2 equivalents of quina ($C^{38} H^{22} O^{4} N^{2}$, Laurent), 1 of sulphuric acid, and 8 of water.

In the preparation of sulphate of quina, the mother liquor that is left has a strongly bitter taste, and on the addition of an alkaline carbonate deposits a yellowish white or brownish precipitate, which on being washed with water and gently heated agglutinates into a resinous looking mass. This resinous substance was named by Sertuerner, who first discovered it, *Quinoidine*, and was found by him as well as by others, who employed it in medicine, to possess properties but little inferior to sulphate of quina. Liebig has more recently investigated this matter, and has found that the so-called *quinoidine*, is uncrystallizable or *amorphous* quina, combined with various inert substances. From these, the *amorphous quina* has been separated; it is identical in chemical composition with, and has the same atomic weight as quina, from which it appears to differ only in form—that is to say, it cannot be made to assume a crystalline shape. Roder believes it to be quina combined with a resin, while Van Heijningen states that he has resolved it into ordinary quina, cinchonia, quinidina, and a resinous substance. *Amorphous quina* is completely soluble in dilute sulphuric acid and in alcohol, and combines with the various acids to form salts.

Quina is most readily obtained by precipitating a solution of the disulphate with ammonia, when it occurs in the form of a snow-white amorphous powder, which may be readily obtained in the form of delicate silky needles, by dissolving it to saturation in boiling alcohol, and cooling the solution very slowly; it is void of odour, has an extremely bitter taste, and is strongly alkaline. It requires for its solution 200 parts of boiling water but is very soluble in alcohol and in ether. *Cinchonia* may be obtained from pale bark by a similar process to that for the preparation of quina from yellow bark. It crystallizes in colourless prisms, is inodorous, and has a feebly bitter taste. It requires 2500 parts of boiling water to dissolve it, is but slightly soluble in cold ether, and is much less soluble in alcohol than quina; in other respects it bears much resemblance to that alkaloid. Its composition is $C^{38}H^{22}N^{2}O^{2}$ (Laurent.) The existence of another alkaloid in cinchona, possessing the same composition as quina had been noticed by several analytical chemists, but its distinct nature was first fully proved by Van Heijningen in 1848 who termed it *β. quinine*, followed by Hlasiwetz in 1850 who named it *Cinchotin*, and by Leers in 1852. The correctness of the views of those who regard it as a distinct alkaloid is now generally acknowledged; it has been therefore named *Quinidina*, and its composition has been stated by Laurent and Leers to be $C^{36}\ H^{22}\ N^{2}\ O^{2}$. It is found in most of the pale barks, being obtained from them by a process similar to that for procuring quina, but its salts being more soluble than those of quina they remain in the mother waters. In other respects, both the alkaloid and its salts very closely resemble quina and its salts. The fourth alkaloid, which was named by its discoverers *Aricina*, was found by Pelletier and Caventou in Arica or Cuzco-bark. The other substances of which cinchona bark is composed are unimportant in a medical point of view. Gum is found in the pale barks only.

The active constituents of cinchona bark are extracted by water, alcohol, proof spirit, and the dilute acids. Of these the acids much diluted, and proof spirit are the best solvents. Boiling water dissolves out the active principles more completely than cold water, but continued boiling, as in preparing decoctions and syrups, causes the red colouring matter to form a very insoluble compound with the alkaloids. The action of various re-agents on the infusion of cinchona bark, has been proposed as a means for ascertaining the medicinal value of the different varieties; but the results obtained by those who have published their experiments are so dissimilar, that it is unnecessary to give any account of them here.

ADULTERATIONS.—The principal frauds that are practised with reference to cinchona bark are, the substitution of the inferior true barks for the finer sorts; the admixture of bark which has been exhausted by successive macerations and then dried, with good bark; and the substitution of the so-called *spurious* or *false cinchona barks* for the true barks. Of the false barks, three in particular have been described, namely Piton bark, Caribean bark, and Pitaya bark. They have all a disagreeable bitter taste, not aromatic: the latter only has been met with in British commerce; it occurs in quills, thin, compact, grayish-yellow externally, blackish-brown internally. A class of barks called on the continent *white cinchonas*, but always looked on in the British market as *spurious* or *false cinchonas*, is often met with, mixed with the officinal barks. They are distinguished by the epidermis being whitish or pale yellowish, micacious, smooth or not cracked, and adherent to the cortical layers. The other adulterations which have been mentioned above are very difficult to discover, as great experience is required to judge of the quality of bark by its physical properties, especially if in powder. Of the quality of yellow bark, the best characteristic is, the quantity of the alkaloid quina which it yields when treated by the processes of the Pharmacopœias ; but as they are difficult of application on the small scale the Edinburgh College has given the following test, by which the greater part of the alkaloid contained may be readily procured in an impure state :—"A filtered decoction of 100 grs. in f℥ij. of distilled water gives, with f℥j. of concentrated solution of carbonate of soda, a precipitate which when heated in the fluid becomes a fused mass, weighing when cold two grains or more, and easily soluble in solution of oxalic acid." Manufacturers of the disulphate of quina however generally employ the test proposed by Guibourt, by which the quantity of lime contained in the specimen is ascertained, for it has been found that those barks which are most rich in quina also contain most lime ; the process is as follows :—"Mix the bark in fine powder with water, so as to form it into a firm paste, place this on paper, filter and add sulphate of soda to the filtered liquor as long as the white sulphate of lime is precipitated." According to Berzelius, the most efficacious barks are those which contain most tannin : consequently, those which in infusion give the largest precipitate with solution of gelatin and with tartar emetic, should be preferred; and this test is applicable to all sorts of cinchona bark. Powdered cinchona bark is often adulterated with *red-saunders wood* in fine powder; the fraud may be easily detected by agitating the suspected specimen either with oil of turpentine or sulphuric ether : if it be thus adulterated, it will communicate a saffron colour to either of these liquids after a few minutes, but the pure bark has no effect on them.

Disulphate of quina is very liable to adulteration; the substances which are generally employed for this purpose are, sulphate of lime, gum, sugar or mannite, starch, fatty matters, and sulphate of cinchonia. By the application of the tests of the Edinburgh Pharmacopœia, the freedom from any of these impurities, except that with the salt of cinchona will be ascertained :—"A solution of gr. x. in f℥j. of distilled water, and two or three drops of sulphuric acid, if decomposed by a solution of ℥ss. of carbonate of soda in two waters, and heated till the precipitate shrinks and fuses, yields on cooling a solid mass, which when dry weighs 7·4 grains and in powder dissolves entirely in solution of oxalic acid." The presence of a salt of cinchonia, from which in the present day but few specimens are free, may be detected by precipitating with ammonia a solution of the salt in water, collecting the precipitate and boiling in rectified spirit ; if any cinchonia be present, it will be deposited in crystals as the liquor cools. *Salicin* and *Caffeïn* are stated to be frequently employed on the continent of late years for the adulteration of disulphate of quina, the latter is too dear in this country to be used for that purpose ; the presence of the former may be discovered by the addition of a few drops of sulphuric acid, if any salicin be present it will be changed to a bright red colour, but no effect is produced on pure disulphate of quina. The following are the characteristics and tests for disulphate of quina given in the last edition of the London Pharmacopœia :—"Soluble in water, especially when mixed with an acid ; quina is thrown down from this solution on the addition of ammonia, and the solution being then evaporated what remains should not taste of sugar ; a gentle heat drives off 8 or 10 grains of water from 100 grains of disulphate of quina ; it is destroyed by heat ; freshly prepared chlorine being added to it and afterwards ammonia it becomes green ; chloride of barium being added to a solution of 100 grains in water mixed with hydrochloric acid, the precipitated sulphate of baryta when dried by a red heat weighs 26·6 grains.

The preparation of *amorphous quina* has been made the subject of a patent in England, nevertheless, from observations which have been made on it, most of what has been hitherto offered for sale does not appear to be of very good quality. Liebig gives the following simple test for ascertaining its purity :—"Completely soluble in dilute sulphuric acid and in alcohol ; the solution in a dilute acid yields upon precipitation by means of ammonia exactly the same amount of precipitate as the weight of the substance originally dissolved in the acid." An *unbleached* sulphate of quina has been also recently introduced into the English market, it is a cheap and good preparation.

THERAPEUTICAL EFFECTS—The topical action of cinchona bark is astringent, antiseptic, and somewhat irritant ; its general effects on the system, especially if given where debility exists, are eminently tonic ; and when administered in certain states of disease, it is anti-periodic, that is to say, it possesses the power of checking diseases which recur at regular intervals, as ague, remittent fever, and periodic neuralgia. The cinchona alkaloids, without its astringency, possess in a concentrated degree the other properties of bark, and consequently since their discovery have been substituted to a great extent for the drug itself. Of the alkaloids, it has been a very generally received opinion that quina is much more active than cinchonia, and consequently the use of the latter has been very restricted ; recent experience, however, particularly on the continent, goes far to establish the almost equal activity of cinchonia ; indeed, according to some, while equally energetic as a tonic and anti-periodic, it is less irritant ; yet some carefully conducted experiments by Bouchardat, Delondre and Giraud show that while sulphate of cinchonia does not like sulphate of quina produce ringing in the ears and derangement of vision, it gives rise to intense headache chiefly affecting the brows and accompanied by a remarkable feeling of compression of the head, and also that its administration causes precordial pains, sighing and a sensation of fainting. Quinidina appears to be nearly if not quite as active as quina, at least such was the result arrived at by the late Dr. Pereira in some trials which he made with the sulphate in the City of London Hospital; it has not however been as yet sufficiently tested, and therefore is not in general use. Aricina has not been employed in medicine that I am aware. Most practitioners, however, are of opinion that none of the alkaloids possess the same medical properties as cinchona bark, more especially in the treatment of intermittent diseases; but if reliance can be placed on the statements of those who have employed it, the amorphous quina of Liebig above described is identical in action with the bark itself.

As a topical agent bark has been used in the form of powder or decoction as an application to foul ulcers with excessive discharge, and to mortified parts; but for this purpose it is inferior to many of the vegetable substances contained in the division *Astringents* (See Chapter IV.) As an internal remedy, bark is the most highly esteemed and most generally employed tonic in the whole Materia Medica. Its employment is indicated in all cases of debility, unaccompanied by any tendency to inflammation or to active hemorrhage, and provided also the stomach and digestive organs be not in an irritable condition. It is found peculiarly serviceable in those forms of debility with great laxity of the solids, which depend on, or are attended with, profuse discharges from the secreting organs. In the debility attendant on convalescence from acute diseases, cinchona and its alkaloids are also found most efficacious tonics, but they should be administered at first with great caution, as any over-excitement is apt to cause a recurrence of the febrile or inflammatory symptoms.

The principal use, however, of bark (or of the preparations of quina) is as an *antiperiodic*. In all diseases assuming an intermittent or remittent type, it is found to be the most efficacious remedy which has been as yet discovered; but its *modus operandi* in the cure of these maladies is so obscure, that it is in general said to be *specific*. Bark and the preparations of quina are best administered during the stage of intermission or remission, and given in as full doses as the stomach can bear, for it is essential to their beneficial influence that vomiting or purging be not produced. If there is irritability of the stomach or any inflammatory tendency present, they should be previously removed by appropriate treatment; and indeed in most cases of intermittent fever, the administration of an emetic and purgative, previously to the employment of cinchona or its alkaloids, will be found serviceable. In neuralgic affections, in rheumatism, head-ache, amaurosis, stricture, &c., recurring at regular intervals, bark is found equally efficacious as in intermittent fever. It is also employed with much benefit in some inflammatory affections, when they assume an asthenic type, or when they occur in the old and debilitated, as in erysipelas, rheumatism, scrofulous ophthalmia, &c.

Disulphate of quina, given in large doses frequently repeated, has been in many instances found productive of much benefit in the treatment of tetanus; and it has been also much used in France, in doses of from one to three scruples, repeated three or four times a day, as a remedy for acute rheumatism. In all the diseases above enumerated, unless where an astringent effect is required, the cinchona alkaloids may be used, and they are preferred by many to the bark itself. I must however confess that every day's increased experience induces me to prefer the preparations of bark to those of any of its alkaloids when a tonic effect is sought for.

DOSE AND MODE OF ADMINISTRATION.—Cinchona bark is seldom given in the present day in the form of powder; the dose as a tonic, is from gr. x. to ℈ij. two or three times a day; as an antiperiodic, from ʒj. to ʒij. every second or third hour, but few stomachs can bear such large doses. Its taste is best concealed by milk, with which, however, it should not be mixed until immediately before it is taken.

Infusum Cinchonæ, D. L. E. *Infusum Cinchonæ pallidæ,* L. ("Take of Peruvian bark (crown or pale), in coarse powder, ℥j.; boiling water, Oss.: infuse for one hour in a covered vessel, and filter through paper. The product should measure about eight ounces," D. "Yellow bark, bruised, ℥j.; boiling distilled water, Oj.; macerate for two hours in a covered vessel, and strain. The Infusion of Pale Bark is prepared in the same manner," L. "Take of any species of cinchona according to prescription ℥j. in powder; boiling water, Oj.; infuse for four hours in a covered vessel and then strain through linen or calico," E.) These preparations are mildly stomachic and tonic, principally employed in dyspepsia and in the simpler forms of debility. Dose, f℥j. to f℥iij. In the former edition of the Dublin Pharmacopœia the infusion of bark was prepared with cold water, by maceration for 24 hours; it was a favourite remedy with most practitioners in cases where irritability of the digestive organs contraindicated the use of a more active preparation.

Infusum Cinchonæ spissatum, L. *Infusum Cinchonæ pallidæ spissatum,* L. (Yellow cinchona bark, coarsely powdered, ℔iij.; distilled water, Ovj.; rectified spirit, a sufficiency; macerate the cinchona in the same manner as is directed for preparing the extract, and strain; evaporate the mixed infusions in a water-bath to one-fourth, and set aside that the dregs may subside; pour off the clear liquor and strain what is left; then mix and evaporate again until the specific gravity of the solution is 1·200; to this when cold pour in the spirit very gently, so that to each fluid ounce three fluid drachms may be added; finally set aside the liquor for twenty days that the dregs may completely subside. The Concentrated Infusion of Pale Bark is prepared in a similar manner.) These concentrated infusions are about thirty times the strength of the simple infusions, for the immediate preparation of which they may be used; or they may be given in doses of from min. xx. to fʒj.

Decoctum Cinchonæ, D. L. E. *Decoctum Cinchonæ pallidæ,* L. *Decoctum Cinchonæ rubræ,* L. ("Peruvian bark, crown or pale, in coarse powder, ℥ss.; water, Oss.; boil for 10 minutes in a covered vessel, and strain while hot; the product should measure about f℥viij.," D. "Yellow cinchona bark, bruised, ʒx.; distilled water, Oj.; boil for ten minutes in a lightly covered vessel and strain the decoction while hot. The Decoction of Pale Bark and the Decoction of Red Bark are prepared in the same manner with the respective barks," L. "Crown, gray, yellow, or red cinchona, bruised, ℥j.; water, f℥xxiv; mix them, boil for ten minutes, let the decoction cool, then filter it, and evaporate to sixteen fluid ounces," E.) Dose, f℥j. to f℥ij.

Tinctura Cinchonæ, D. L. E. *Tinctura Cinchonæ pallidæ*, L. ("Peruvian bark, (crown or pale), in coarse powder, ℥viij.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Yellow bark, bruised, ℥viij.; proof spirit, Oij.; macerate for seven days, express and filter. The Tincture of Pale Bark is prepared in a similar manner," L. "Yellow bark, in fine powder, or any other species of cinchona according to prescription, ℥viij.; proof spirit, Oij.; percolate the bark with the spirit, the bark being previously moistened with a very little spirit, left thus for 10 or 12 hours, and then firmly packed in the cylinder. This tincture may also be prepared, though much less expeditiously, and with much greater loss by the usual process of digestion, the bark being in that case reduced to coarse powder only." E.) Dose, fʒj. to fʒiij.

Tinctura Cinchonæ composita, D. L. E. ("Peruvian bark (crown or pale), in coarse powder, ℥iv.; bitter-orange peel dried, ℥ij.; virginia snake-root, bruised, ʒvj.; saffron, chopped fine, ʒij.; cochineal, in powder, ʒj.; proof spirit, Oij.; macerate for 14 days, strain, express, and filter," D. "Pale cinchona bark, bruised, ℥iv.; orange peel, dried, ℥iij.; serpentaria, bruised, ʒvj.; saffron, ʒij.; cochineal, bruised, ʒj.; proof spirit, Oij.; macerate for seven days, express and filter," L. "Yellow bark, in coarse powder (fine if percolation be followed), ℥iv.; bitter-orange peel, bruised, ℥iij.; serpentaria, in moderately fine powder, ʒvj.; saffron, chopped, ʒij.; cochineal, bruised, ʒj.; proof spirit, Oij.; macerate for seven days, strain, express strongly, and filter the liquors. It may be also conveniently prepared by percolation, as directed for compound tincture of cardamoms," E.) This, a more agreeable but less powerful tonic than the simple tincture, is an excellent preparation, when the digestive organs are much debilitated; I have found it especially useful in idiopathic erysipelas. It is commonly known as *Huxham's tincture of bark*. Dose, fʒj. to f℥ss.

Liquor Cinchonæ, (Prepared by exhausting any quantity of powdered yellow bark in a percolator first with proof spirit, and then with boiling water, mixing the liquors, and concentrating in vacuo, or with a gentle heat.) An excellent and active preparation; Dose, min. xx. to fʒss.

Extractum Cinchonæ, L. E. *Extractum Cinchonæ pallidæ*, L. *Extractum Cinchonæ rubræ*, L. ("Yellow cinchona, coarsely powdered, ℔iij.; distilled water, Ovj.; add four pints of the water to the bark, and stir constantly with a spatula until the whole is thoroughly moistened, macerate for 24 hours and strain through linen; macerate what remains in the rest of the water for 24 hours and strain; then evaporate the mixed liquors to a proper consistence. The Extracts of the Pale and Red Barks are prepared in a similar manner with the respective barks," L. "Take of any variety of cinchona, but especially the yellow or red cinchona in fine powder, ℥iv.; proof spirit, f℥xxiv.; percolate the cinchona with the spirit; distil off the greater part of the spirit, and evaporate what remains in an open vessel over the vapour bath to a due consistence," E.) The Edinburgh preparation, in which spirit is used as the solvent, is much the more active, but since the introduction of the preparations of quina into medicine, the extracts are seldom used. Dose, gr. v. to gr. xx.

Syrup of Bark, CADET. (Any variety of cinchona bark, according to prescription, bruised, ℥iij.; pure sugar, ℔j. ℥iv.; distilled water, Oiij.; boil for half an hour in a covered vessel; remove from the fire, set aside for a quarter of an hour and then strain with expression; as soon as the liquid is quite cold, filter; evaporate the filtered liquid, with a gentle heat to the consistence of a syrup, and finally strain.) This is, in my opinion, the best form for preparing the syrup of bark; I have tried it for some years with excellent results. The dose is from fʒj. to f℥ss.

Jelly of Bark and Iceland Moss, (Iceland moss; Carragheen moss, of each, ʒj.; cinchona bark, in coarse powder, ℥ss.; boil slowly for three quarters of an hour in a quart of water; express through fine muslin, and add, tincture of orange peel, fʒij.; and white sugar, ℥ij.) I am indebted to Dr. W. D. Moore of this city for the formula for this preparation; the dose of it is one or two teaspoonfuls three times a day.

Quina and *Cinchonia* are but seldom employed in the uncombined state, in consequence of their insolubility; nevertheless they are preferred by some continental practitioners to any of their salts. The dose of either is from gr. iij. to gr. v. frequently repeated. Quinidina may be given in the same dose.

Quinæ Sulphas, D. E. *Quinæ Disulphas,* L. Dose, gr. j. to gr. v. three or four times a day. As an antiperiodic, it is given in ague during the intermission, in divided doses, so regulated that from gr. xv. to ℈ij., according to circumstances, shall be taken in all. It may be administered in the form of pill, made with confection of roses or mucilage, or dissolved in some aqueous vehicle with the aid of dilute sulphuric acid; it should not be prescribed, as is frequently done in the infusion of roses, as most of it is precipitated in the form of an insoluble *tannate* of quina by the tannic acid contained in that preparation. Disulphate of quina may be administered in the form of enema, where there is very great irritability of the stomach; three times the ordinary dose or even more may be mixed with an ordinary starch enema, and administered about an hour before the paroxysm. Or it may be introduced into the system by the endermic method, the ordinary dose being sprinkled over the surface of the skin, denuded of the epidermis by means of a blister. In intermittent head-ache, gr. j. of the disulphate, mixed with gr. iij. of starch, may be snuffed up the nostrils occasionally.

Tinctura Quinæ composita, L. (Disulphate of quina, ʒv. ℈j.; tincture of orange, Oij.; digest for seven days or until it is dissolved, and filter.) Each fluid drachm contains one grain of the salt. Dose, fʒj. to f℥ss.

Pilulæ Quinæ Sulphatis, UNITED STATES PHARMACOPŒIA. (Sulphate of quina, ℥j.; gum arabic, in powder, ʒij.; honey, a sufficient quantity; mix the sulphate of quina and the gum, then beat them with the honey so as to form a mass to be divided into 480 pills.) Each pill contains gr. j. of the disulphate of quina.

Vinum Quinæ, COLLIER. (Disulphate of quina, gr xxiv.; citric acid, in crystals, gr. xv.; rub together, and dissolve in orange wine, f℥xxiv.) An elegant formula: Dose, f℥ss. to f℥ij.

Quinæ Murias, D. (Take of sulphate of quina, ℥j.; chloride of barium, gr. cxxiij.; distilled water, f℥xxxij.; dissolve the chloride of barium in two ounces of the water, and the sulphate of quina in the remainder, raised to the temperature of ebullition. Mix the two solutions, evaporate to one-half, filter, and continue the evaporation by means of a steam or water heat, until crystalline spiculæ begin to appear. The solution is now to be permitted to cool, and the crystals which separate to be dried on blotting paper. The liquor decanted off the crystals will, by further concentration and cooling, yield an additional product.) The muriate of quina is preferred by many practitioners to the disulphate, but it is much more expensive; the dose is the same.

Acetate, Citrate, Tartrate, Nitrate, Phosphate, and Tannate of Quina, have been also used in medicine: they are all expensive preparations, and do not appear to me to be superior in any respect to the disulphate. They may be readily prepared by dissolving pure quina or *amorphous quina* to saturation, in the respective acids previously diluted with water, evaporating and crystallizing; their doses are the same as those of the disulphate.

Amorphous quina is administered in the same doses as the disulphate; it may be given dissolved in water by means of a few drops of any dilute acid.

Arseniate of Quina has been recently employed in France with much success in the treatment of intermittent fevers. It is prepared by boiling for a short time in a glass flask, a mixture of ʒiiiss. of pure quina, ʒj. of arsenious acid, and f℥iv. of distilled water, allowing the crystals to be deposited by cooling, separating them by filtration, and purifying by re-crystallization in distilled water. When well prepared, it is in the form of minute, feathery, white crystals. It is a bibasic salt; is soluble in boiling water, from which the greater portion is deposited as the solution cools; is slightly soluble in proof spirit, but very sparingly so in alcohol; and is insoluble in ether. The dose of it is from a tenth to a fourth of a grain dissolved in a large quantity of water.

The *Valerianate of quina* has been described in the chapter on *Antispasmodics* (see, page 49.)

The salts of cinchonia are prepared in a similar manner to those of quina; their doses are the same.

INCOMPATIBLES.—*With the preparations of Cinchona bark.*—Ammonia; lime water; carbonate of potash; tartar emetic; the sesqui-salts of iron; the acetates of lead; corrosive sublimate; nitrate of silver; tincture of galls; and gelatin. *With disulphate of quina.*—The alkalies, and their carbonates; lime-water; tartaric acid; the soluble tartrates; and all vegetable tinctures, infusions, and decoctions containing tannin.

CONTRAJERVA.—*Contrayerva. Root of Dorstenia Contrajerva.* A native of South America; belonging to the Natural family *Urticaceæ* (*Moraceæ,* Lindley), and to the Linnæan class and order *Monœcia Tetrandria.*

The contrayerva root of the shops is imported from Brazil, and is obtained from the *Dorstenia braziliensis.* It is of a reddish-colour, tapering, from 2 to 3 inches long, about the thickness of the little finger, and covered with slender root fibres. It has a weak aromatic odour, and a warm bitter taste. Contrayerva root is a mild aromatic tonic at one time used in fevers of a low character, but at present it is very rarely employed. The dose of the powder is from ℈j. to ℈ij. Contrayerva has been omitted from the last edition of the London Pharmacopœia.

CUPRI AMMONIO-SULPHAS, D. L. CUPRUM AMMONIATUM, E.—*Ammonio-sulphate of Copper. Ammoniated Copper.*

PREPARATION.—"Take of sulphate of copper, ℥ij.; commercial sesqui-carbonate of ammonia, ℥iij.; rub them together in a porcelain mortar until effervescence has ceased, then roll up the residue in bibulous paper, and place it on a porous brick. When dry let it be enclosed in a bottle furnished with a well-fitted stopper," D. Sulphate of copper, ℥j.; sesqui-carbonate of ammonia, ℥iss.; triturate them well together till the carbonic acid has ceased to escape; then wrap the ammonio-sulphate of copper in bibulous paper, and dry it in the air," L. "Sulphate of copper, ʒij.; carbonate of ammonia, ℥iij.; triturate them thoroughly together till effervescence ceases; wrap the product in blotting paper, and dry it first by folds of blotting paper, afterwards by exposure to the air for a little; and preserve it in closely stopped bottles," E.

PHYSICAL PROPERTIES.—As usually met with, this preparation is of a fine azure-blue colour, with an ammoniacal odour, and a styptic metallic taste. It is in the form of powder, but may be crystallized in large right rhombic prisms.

CHEMICAL PROPERTIES.—The exact composition of the salt, as prepared for use in medicine, is doubtful; but according to Wittstein its formula is $(N\,H^4\,O + S\,O^3) + (N\,H^3 + Cu\,O.)$ Exposed to the air, ammonia is given off, and a green powder left. It is completely soluble in 1½ parts of cold water; but in a large quantity of water is decomposed, a pale blue powder, which contains less ammonia, being precipitated; the solution has an alkaline reaction.

ADULTERATIONS.—This compound is scarcely liable to adulteration; the following are the characteristics and tests given for it in the last edition of the London Pharmacopœia:—"Pulverulent, of an azure colour, converted by a strong heat into oxide of copper, sesqui-carbonate first and afterwards sulphate of ammonia being driven off; soluble in water: the solution turns turmeric brown, and is changed to a green colour on the addition of arsenious acid."

THERAPEUTICAL EFFECTS.—Ammoniacal sulphate of copper is employed in medicine as a tonic, and in consequence of its powers as such, as an antispasmodic also. It has been principally used in the treatment of epilepsy, chorea, and other spasmodic affections, and is frequently productive of great benefit when these diseases occur in debilitated constitutions about the period of puberty, and are unassociated with organic disease. It is not, however, as much employed at present as it was formerly.

DOSE AND MODE OF ADMINISTRATION.—Gr. ss. gradually increased to gr. v. twice or three times daily; it may be given in the form of pill made with bread crumb or confection of roses.

Pilulæ Cupri Ammoniati, E. (Ammoniated copper, in fine powder, 1 part; bread crumb, 6 parts; solution of carbonate of ammonia, a sufficiency; beat into a proper pill mass, and divide it into pills, each containing gr. ss. of ammoniated copper.)

Cupri Ammoniati Aqua, E. *Liquor Cupri Ammonio-sulphatis*, L. (Ammoniated copper, ʒj.; distilled water, Oj.; dissolve the salt in the water and filter.) This solution is not employed in medicine; it was introduced into the pharmacopœias with the intention of being used as a test for arsenious acid, (see page 163.)

INCOMPATIBLES.—Acids; potash; soda; and lime water.

In poisoning with this salt, the treatment is the same as in poisoning with sulphate of copper, (see page 68.)

CUPRI SULPHAS.—*Sulphate of Copper* (described in the division *Astringents*), has been employed as a tonic in chorea and epilepsy, but the ammoniacal sulphate is more generally preferred in these diseases. The dose and mode of administration have been described in the division *Astringents*, (see page 68.)

CUSPARIA, L. E.—*Cusparia or Angostura bark. Bark of Galipea cusparia?* L. *Bark of Galipea officinalis*, E. The bark is probably obtained from both species of *Galipea* mentioned above.

They are natives of the warmer regions of South America, and belong to the Natural family *Rutaceæ*, and to the Linnæan class and order *Diandria Monogynia.*

BOTANICAL CHARACTERS.—*Galipea officinalis* (Hancock) attains a height of only from 15 to 20 feet: Leaves, trifoliate, from 6 to 10 inches long, having the odour of tobacco; Flowers, white, hairy, in stalked, axillary, terminal racemes.—*Galipea cusparia* (St. Hilaire) is a lofty tree, 60–80 feet high; Leaves, trifoliate, about 2 feet long, agreeably fragrant; Flowers, white, with fascicles of hairs seated on glandular bodies on the outside, in stalked, almost terminal racemes.

PHYSICAL PROPERTIES.—Cusparia bark occurs in pieces from 3 to 10 inches in length, some nearly flat, others incompletely quilled, covered externally with a grayish-yellow, soft epidermis, removed from one edge apparently with a sharp knife; internally it is of a dark yellowish fawn colour, somewhat fibrous. It breaks with a short resinous fracture; has a peculiar, rather unpleasant odour, and a warm, bitter, somewhat acrid taste.

CHEMICAL PROPERTIES.—According to the analysis of Fischer, this bark consists of 3·7 per cent. of a peculiar bitter principle (which has been named *Cusparin* by Saladin, who obtained it in a crystalline state by submitting an alcoholic tincture of the bark, prepared by percolation, to spontaneous evaporation), 1·7 of bitter hard resin, 1·9 of balsamic soft resin, 0·3 of volatile oil, gum, lignin, &c. The active properties of the bark are extracted by water and alcohol; it is probable that they depend on the neutral principle Cusparin, and on the bitter resin.

ADULTERATIONS.—About the commencement of this century, the substitution of a highly poisonous bark, which was brought from the East Indies, for true angostura bark, was very common in the British Isles and in various parts of the continent; but since then, so far as I am aware, it had not been met with until some years since, when a specimen of the false bark was sent to me from a druggist's in this city, labelled *Angustura bark.* Upon inquiry, I found that a chest containing about two cwt. of the bark had lain in their store-house for upwards of forty years, but had never been before dispensed. False angostura bark may be readily distinguished from the true bark by its physical as well as chemical properties. It is generally in more perfectly quilled pieces, always much thicker and heavier; the epidermis is thickly mottled with grayish spots, or covered with a rusty efflorescence; the taste is intensely bitter, very permanent, but it has no odour. The best chemical test is the application of nitric acid to a transverse fracture: it produces a bright red colour with the false bark, but merely deepens the colour of the true bark. The rusty efflorescence on false angostura bark is stained greenish-black by the same acid. This false bark was for a long time referred to the *Brucea antidysenterica*, a native of Africa; but the investigations of Christison, O'Shaughnessy, and others, have proved that it is the bark of *Strychnos nux-vomica*, (see page 456.)

THERAPEUTICAL EFFECTS.—Angostura bark is an excellent tonic, devoid of all astringency. It bears much resemblance to cinchona bark, than which it is generally held in much higher estimation as a febrifuge in South America,—being adapted for the worst and most malignant bilious fevers of the marshy districts, while the fevers in which cinchona bark is employed there, are simple intermittents, for the most part unattended with danger. It has never come into general use in Europe, in consequence of the serious accidents which resulted from the fraud above noticed, and it has been omitted from the last edition of the Dublin Pharmacopœia ; nevertheless, it will be found very serviceable in atonic dyspepsia, in convalescence from acute diseases, and in the advanced stages of diarrhœa and dysentery.

DOSE AND MODE OF ADMINISTRATION.—In powder gr. x. to ʒss.

Infusum Cuspariæ, L. E. ("Angostura, bruised, ʒv. ; boiling distilled water, Oj. ; macerate for two hours in a lightly covered vessel and strain," L. "Cusparia, bruised, ʒv. ; boiling water, Oj. ; infuse for two hours in a covered vessel, and then strain through linen or calico," E.) Dose, f℥j. to f℥ij.

Tinctura Cuspariæ, E. (Angostura bark, in moderately fine powder, ℥ivss. ; proof spirit, Oij. ; made like the tincture of cinchona, and most expeditiously by the process of percolation.) Dose, fʒj. to fʒij.

INCOMPATIBLES.—The mineral acids ; sesqui-salts of iron ; nitrate of silver ; and the acetates of lead.

FEL BOVINUM.—*Ox-Gall. The fluid contents of the gall bladder of the ox, inspissated by heat.*

Ox-gall, although at one time much employed in medicine, had fallen completely into disuse until lately, when it has been again brought under the notice of the profession, as an excellent tonic in various forms of dyspepsia. From my own experience of its effects in numerous cases in which I employed it, I can speak most highly of its remediate powers, particularly in that morbid irritability of the stomach accompanied by vomiting soon after the meals have been taken, and which does not depend on organic disease ; it appears also to act as a gentle laxative. The following is the preparation which I have employed :—

Fel Bovinum inspissatum, (Ox-gall, any quantity ; dilute with an equal quantity of distilled water, set aside for 12 hours until the impurities subside ; pour off the clear liquor, boil and strain through linen or calico. Lastly, evaporate it in a water-bath to the consistence of an extract.) Thus prepared it is odourless, but has an intensely bitter taste, leaving a somewhat sweetish impression upon the tongue and palate ; the dose of it is from gr. v. to gr. x. two or three times a day.

FERRUM, D. FERRUM IN FILA TRACTUM, L. FERRI FILUM ET LIMATURA, E.—*Rod Iron, Iron wire, turnings and filings,* D. *Iron wire,* L. *Iron in the form of wire and in the form of filings,* E.

FERRI PULVIS, D.—*Iron in fine powder. Metallic Iron reduced to a state of minute division by means of hydrogen.*

Iron is said to be met with in the metallic state in Russia and America, but is very rare; it is usually found combined with other minerals in the state of oxide, sulphuret, carbonate, &c.

PREPARATION.—Metallic iron is an article of the Materia Medica in the three British Pharmacopœias. It is most generally obtained from the native black oxide—*magnetic iron ore*, and from the native carbonate of the protoxide—*clay iron stone*, by smelting in blast furnaces.—PULVIS FERRI, D. (Take of peroxide of iron; zinc, in small pieces; oil of vitriol water, of each, a sufficient quantity: introduce into a gun-barrel as much of the peroxide of iron as will occupy the length of about ten inches, confining it to the middle portion of the barrel by plugs of asbestos. Let the gun-barrel be now placed in such a furnace as is used for organic analysis, one end of it being fitted by means of a cork into a bent adapter whose further extremity dips in water, while the other end (of the barrel) is connected with a bottle containing the zinc and water, with the intervention, however, of a desiccation tube including fragments of caustic potash, and a small bottle half filled with oil of vitriol. Matter being thus arranged, a little oil of vitriol is to be poured into the bottle containing the water and zinc, with the view of developing a sufficiency of hydrogen to expel the air from the interior of the apparatus. As soon as this object is considered to have been accomplished, the part of the tube containing the peroxide of iron must be surrounded with ignited charcoal, and when it is thus brought to a low red heat, the oil of vitriol is to be gradually added to the zinc, so as to cause a steady current of hydrogen to pass through the oil of vitriol and desiccation tube into the gun-barrel. As soon as the reduction of the oxide is completed, which may be judged to have taken place when the gas bubbles escape at apparently the same rate through the water in which the adapter terminates, and through the bottle containing the oil of vitriol, the fire is to be removed (a slow current of hydrogen being still continued), and when the gun-barrel has assumed the temperature of the air, its metallic contents should be extracted, and preserved in an accurately stopped bottle.)

PROPERTIES.—Pure metallic iron is of a silver-white colour, but as ordinarily met with, is grayish-white, very brilliant, hard, and ductile. It is very malleable, particularly when heated; has a peculiar taste, and emits an odour when rubbed. At an intense heat iron fuses, but before it arrives at the point of fusion, it becomes soft, and in this state possesses a remarkable property, that of being *welded*. Iron is attracted by the magnet, and becomes itself magnetic by induction, but if pure, immediately loses its polarity when withdrawn from the magnet. Its specific gravity is 7·8, and its atomic weight 28.

ADULTERATIONS.—Since the introduction of the *pulvis ferri* into practice, the demand for it has steadily increased, and consequently its preparation being difficult, troublesome, and expensive, it could scarcely be expected to escape adulteration; it is, however, rather a sophistication than an adulteration which has been practised with respect to this preparation. The fraud, which for some time attracted much notice, in consequence of a dispute to which it had given rise between two rival wholesale chemists in London, consists in the substitution of the magnetic black oxide of iron for the powder of iron. The taste is at once sufficient to detect this, the latter being perfectly tasteless when placed on the tongue, while the former has the peculiar inky taste of the ferruginous preparations. Chemically they may be distinguished by the powder of iron being completely soluble in dilute sulphuric acid with copious effervescence, while the magnetic oxide effervesces not at all, or but slightly owing to the presence of some sulphuret of iron: the former solution also gives a green precipitate; the latter a black one with an alkali.

THERAPEUTICAL EFFECTS.—Iron, like other metals, does not exert any influence on the human system while it retains the metallic state; but as it is very readily oxidated and converted into salts, this change takes place in the stomach soon after it is swallowed, and then the effects of a tonic are produced. *Iron filings* were at one time much used in medicine, but in the present day they are scarcely every employed in regular practice; the dose of them was from gr. x. to ʒss. administered in the form of electuary or bolus made with treacle or honey.

More recently the employment of metallic iron reduced to a state of minute division by means of hydrogen as in the above formula of the Dublin Pharmacopœia, (*fer réduit* of the French), has been employed on the continent, its use having been first introduced by M. M. Quevenne and Miquelard. The chief circumstance to be attended to during the operation of preparing it is the state of the temperature. If it be not sufficiently high, the reduction does not take place; and if it be too high, the iron is reduced, but is agglutinated into ductile plates. When well prepared it is in the form of a fine light powder, of a bright grayish slate colour, occasionally darker, in very minute division, and free from any trace of sulphur. The advantages which this preparation possesses are, first, that it is readily acted on by the weak acids—the lactic and muriatic, which are ordinarily present in the gastric juice during digestion; and secondly, that it is free from the inky taste, which the preparations of iron possess in a degree proportioned to their solubility; a property rendering it peculiarly applicable for children. I have used the *pulvis ferri* very extensively since the two last editions of this book were published, and with the best results; indeed I consider it superior in most cases to any other ferruginous preparation, being especially adapted for persons in whom the digestive organs are in a feeble or debilitated state, as is so frequently the case when indications exist for the administration of iron. The dose is from gr. j. to gr. x.; it may be given in powder, pill, or bolus.

The general effects of the ferruginous preparations, when their use has been continued for some time, are tonic and astringent; but when they have been given in too large doses, or persisted in for too long a period, they generally produce a state of over-excitement, characterised by a feeling of determination of blood to the head, of general fulness, and by other uneasy sensations. The morbid state of the system in which the preparations of iron are found most useful, is that which has been denominated *anemia,* in which the blood is deficient, in respect both of quantity and of the relative proportion of red particles. The diseases, therefore, in which they have been employed, are chiefly those of debility accompanied by or dependant on anemia, as in chlorosis, amenorrhœa, menorrhagia, diseases of the urinary organs, scrofulous affections, passive hemorrhages, certain diseases of the digestive organs, neuralgia, &c. They have been also used with benefit in diseases of an intermittent or remittent type, in dropsical affections, in chronic enlargements of the liver or spleen, in cancer, in albuminuria—even in acute cases, in the advanced stages of Bright's disease of the kidney, in valvular diseases of the heart when a tonic is indicated, in chronic cutaneous affections, &c. The employment of the ferruginous preparations is contra-indicated when there is any tendency to inflammation or active hemorrhage in the system, when there is irritability of the digestive organs, in persons of a full habit of body, and in those prone to a determination of blood to the head.

It had been lately proposed in France to administer manganese in combination with iron, from a fancied notion that it would be thus rendered more readily assimilable by the system, a notion, in my opinion, resting on no good foundation. Nevertheless the compounds of iron and manganese for a time acquired a sort of fashion, and various formulæ were proposed for preparations containing them ; of these probably the best is that by Dr. Speer of Cheltenham for a *saccharated carbonate of iron and manganese* prepared as follows :—" Finely powdered sulphate of iron, ℥iij. ʒj. ; carbonate of soda, ℥v. ; sulphate of manganese, ℥j. ℈j. ; white sugar, ℥iiss. ; dissolve each of the three first-mentioned ingredients in a pint and a half of water, add the solutions, and mix them well ; collect the precipitate on a cloth, filter, and immediately wash it with cold water ; squeeze out as much of the water as possible, and, without delay, triturate the pulp with the sugar, previously reduced to a fine powder. Dry it at a temperature of about 120°, F."

The compound thus prepared is a powder of a reddish-brown colour, and devoid of all taste, save that imparted by the sugar, with which the salts of the two metals are conjoined. The dose is five grains, gradually increased up to ℈j., three times a day; it should be given with the meals, or at least immediately after.

FERRI ACETATIS TINCTURA, D.—*Tincture of the Acetate of iron.*

PREPARATION.—Take of sulphate of iron, ℥viij. ; distilled water, Oss. ; pure sulphuric acid, fʒvj. ; pure nitric acid, f℥ss. ; acetate of potash, ℥viij. ; rectified spirit, cong. ss. To nine ounces of the water add the sulphuric acid, and in the mixture, with the aid of heat, dissolve the sulphate of iron. Add next the nitric acid, first diluted with the remaining ounce of water, and evaporate the resulting solution to the consistence of a thick syrup. Dissolve this in one quart, and the acetate of potash in the remainder of the spirit, and, having mixed the solutions, and shaken the mixture repeatedly in a large bottle, let the whole be thrown upon a calico filter. When any further liquid ceases to trickle through, subject the filter, with its contents, to expression, and, having cleared the turbid tincture thus procured by filtration through paper, let it be added to that already obtained. The specific gravity of this tincture is ·891.

PROPERTIES.—Tincture of the acetate of iron is a reddish-brown transparent liquid, with an ethereal odour, and an acid chalybeate taste. It is a solution of the acetate of the sesquioxide of iron in rectified spirit.

THERAPEUTICAL EFFECTS.—Acetate of iron possesses the properties of the ferruginous preparations generally; but as its composition is rather uncertain, it is not so much used at present as formerly. The tincture was originally introduced into the pharmacopœia on the authority of Dr. Percival, who thought most highly of the chalybeate powers of this salt of iron. I have employed it extensively in the treatment of phthisis, of chlorosis, and of chronic diseases of the heart, and am inclined to think most favorably of its remedial powers, an opinion strengthened by every day's experience.

DOSE AND MODE OF ADMINISTRATION.—The dose is from min. xxx. to fʒj. Dr. Percival was in the habit of administering it in asses' milk; it may be given thus or dropped in water or in cod-liver oil.

FERRI AMMONIO-CHLORIDUM, L.—*Ammonio-chloride of Iron.*

PREPARATION.—Sesquioxide of iron, ℥iij.; hydrochloric acid, Oss.; hydrochlorate of ammonia, ℔iiss.; distilled water, Oiij.; mix the sesquioxide of iron with the acid, and digest in a sand bath, frequently shaking until it is dissolved; afterwards add the hydrochlorate of ammonia first dissolved in the water; strain and evaporate until the salt is dry; then rub to powder.

PROPERTIES.—This preparation is commonly met with in the form of an orange-yellow, semi-crystalline powder, which attracts moisture when exposed to the air. It emits a feeble odour if moistened, has a saline metallic taste, and is readily dissolved by water and by weak spirit. According to Phillips it is a mechanical mixture of 15 parts of sesquichloride of iron, and 85 parts of hydrochlorate of ammonia. Wittstein gives the following formula for it, $NH^4 Cl + 10 Fe^2 Cl^3$.

ADULTERATIONS.—Ammonio-chloride of iron is not liable to adulteration, but as it keeps badly is sometimes unfit for use in medicine as met with in the shops. The following are the characteristics and tests given for it in the last edition of the London Pharmacopœia:—"Pulverulent, of an orange-colour, soluble in proof spirit and in water; either solution emits ammonia on the addition of potash; which also precipitates about seven grains of sesquioxide of iron from 100 grains of this salt."

THERAPEUTICAL EFFECTS.—This preparation, the *Flores martiales* of the older pharmacologists, was at one time highly esteemed as a tonic and deobstruent in scrofulous affections; but, in consequence of its liability to become decomposed by keeping, and the variable quantity of iron which it contains, is not often prescribed in the present day.

DOSE AND MODE OF ADMINISTRATION.—In the solid state, gr. v. to gr. xv.

Tinctura Ferri Ammonio-chloridi, L. (Ammonio-chloride of iron, ℥iv.; proof spirit; distilled water, of each, Oss.*; dissolve the salt in the spirit and strain. A fluid ounce of this tincture throws down 5·8 grains of sesquioxide of iron on the addition of potash.) Dose, min. xij. to min. xl.

INCOMPATIBLES.—Alkalies, and their carbonates; lime water; and all astringent vegetable preparations.

FERRI AMMONIO-CITRAS, D. L.—*Ammonio-citrate of Iron. Ferro-citrate of Ammonia.*

PREPARATION.—"Take of citric acid, ℥iv.; distilled water, f℥xvj.; sulphate of iron, ℥v.; solution of ammonia, f℥iv.; or as much as is sufficient: dissolve the citric acid in the water with the aid of heat, and, having converted the sulphate of iron into the hydrated peroxide of iron as directed in the formula for *Ferri Peroxydum Hydratum*, introduce the product into the capsule containing the solution of citric acid, and boil for twenty minutes. When the solution has cooled, add, constantly stirring, the ammonia in slight excess, and having transferred the solution thus obtained to delf dinner plates, evaporate it to dryness, by steam or water heat. Lastly, chip off the film of dry salt which adheres to the plates, and preserve it in well-stopped bottles," D. "Sulphate of iron, ℥xij.; carbonate of soda, ℥xiiss.; citric acid, ℥vj.; solution of ammonia, f℥ix.; boiling distilled water, Oxij,; dissolve the sulphate and carbonate separately in Ovj. of the water; mix the solutions while warm and set aside that the precipitate may subside; pour off the supernatant liquor, wash the precipitate with water frequently, and dissolve by means of heat with the acid added; then the ammonia being mixed with it when cold, evaporate to the consistence of a syrup; dry this with a gentle heat, spread thinly on flat earthenware plates; and keep in a well stopped vessel," L.

PHYSICAL PROPERTIES.—The ammonio-citrate of iron occurs in the form of semitransparent shining scales, of a garnet red colour, inodorous; with a mildly styptic metallic taste.

CHEMICAL PROPERTIES.—The ammonio-citrate is a slightly deliquescent salt; it dissolves readily in cold or boiling water, and the solution is neutral to test paper. The composition of this preparation has been variously stated, but all chemists agree that the iron exists in it in the state of sesquioxide. The following is the formula for it given by Wittstein, $(5NH^4\,O + 2\,Ci + 6\,H\,O) + (4\,Fe^2\,O^3 + Ci + 3\,H\,O.)$

ADULTERATIONS.—Not liable to adulteration; but the following characteristics and tests for it are given in the last edition of the London Pharmacopœia:—"Soluble in water; the solution does not affect the colour of either litmus or turmeric; nor does it become blue on the addition of ferrocyanide of potassium; but on the addition of potash or lime water, sesquioxide of iron is thrown down and ammonia given off; about 34 grains of sesquioxide of iron are thrown down by potash from a solution in water of 100 grains."

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* Oj. in the original, but altered by Mr. Phillips to Oss. he states on the authority of the compilers of the pharmacopœia.

THERAPEUTICAL EFFECTS.—The ammonio-citrate of iron resembles much the tartrate to be next described, and is adapted for the same cases. Both these preparations are much milder in their effects than the mineral acid salts of the metal; they are consequently better adapted for delicate persons, and especially for cases in which the digestive organs are in an irritable state; but they are not so useful in anemic diseases.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. viij. in solution.

By combining together 4 parts of citrate of iron, and 1 of citrate of quina, a preparation is obtained which has been named *Ferri et Quinæ Citras*; it may be given in doses of from gr. iij. to gr. vj. in the form of pill, in cases where a combination of these tonics is indicated. This salt is now commonly sold in the shops, and a spurious article which contains no quina is very often substituted for it; the fraud may be readily detected by adding ammonia to the solution, which will throw down the quina if any be present.

Ferri et Magnesiæ Citras.—This preparation which possesses the advantage over the ammonio-citrate of not being deliquescent, has been recently much used on the continent. It is prepared by dissolving two parts by weight of recently precipitated hydrated sesquioxide of iron in a solution of three parts of citric acid, then saturating with carbonate of magnesia and evaporating to dryness. It is thus obtained in the form of shining brown scales; and may be given in powder or pill, in doses of from gr. ij. to gr. x. three times a day. It may be also given in solution sweetened with syrup.

Aqua Chalybeata. Under this name, a solution of citrate of iron in water charged with carbonic acid and flavoured with syrup and oil of the bitter orange, has been introduced to the notice of the profession by Messrs. Bewley and Evans of this city. The exact formula for its preparation has not been made public: every f℥vj. hold in solution gr. xiij. of citrate of iron, it may be therefore given in doses of f℥j to f℥ij. two or three times a day. It is the most agreeable form perhaps in which a ferruginous preparation can be administered, and I have derived the most excellent results from its employment, the only objection to its use being that in some persons it is apt to cause unpleasant eructations shortly after it has been taken; this may be, however, to a great extent prevented by its not being drunk until the effervescence has nearly ceased. It is very generally employed, being found an efficacious preparation of iron.

Tinctura Ferri Aurantiacea, WIRTEMBERG. (Iron filings, ℥iv.; Seville oranges, 4. Remove the peel, the white, and the seeds; beat the pulp with the filings in a stone mortar, and let the paste remain at rest for two days; then pour upon it, Madeira wine, f℥x. and tincture of orange peel, f℥ij.; digest for seven days, express and filter.) A very agreeable preparation; Dose, f℥j. to f℥iv.

INCOMPATIBLES.—The mineral acids; and all astringent vegetable preparations.

FERRI AMMONIO-TARTRAS.—*Ammonio-tartrate of Iron.*

PREPARATION.—"Tartaric acid, 100 drachms; sesquicarbonate of ammonia, crystalline, 39½ drachms; sesqui-(*per*)-oxide of iron, 53½ drachms; muriatic acid, 180 drachms; solution of ammonia, and water, of each, a sufficiency; dissolve the tartaric acid in cong. j. of water and add the sesquicarbonate of ammonia gradually. Dissolve the sesquioxide of iron in the muriatic acid by means of a gentle heat; dilute the solution with Ovj. of water, and add a sufficient quantity of solution of ammonia to precipitate the oxide. Separate this on a flannel filter, wash it with water, until the washings pass tasteless; and add it to the solution containing the bitartrate of ammonia, then apply a gentle heat, by means of a water-bath, until the whole of the sesquioxide of iron is dissolved, and a deep reddish-brown solution results. Lastly, evaporate this solution by means of a water-bath, to dryness."—Mr. PROCTER, *in the American Journal of Pharmacy.*

PROPERTIES.—This preparation (which has been recently introduced into the practice of medicine, and is not contained in any of the pharmacopœias,) is met with in the form of brilliant scales, semitransparent, of a beautiful reddish-brown colour. It is odourless, has a sweetish, slightly chalybeate taste; is soluble in about its own weight of water at 60°, and in a much less quantity of boiling water. It is insoluble in absolute alcohol and in ether. Ammonio-tartrate of iron is composed of one equivalent of basic tartrate of sesqui-oxide of iron, one of tartrate of ammonia, and four of water.

THERAPEUTICAL EFFECTS.—This is an excellent preparation of iron, void of all astringency. It is peculiarly suited as a tonic for those derangements of the uterine organs in which the ferruginous salts are indicated. Its not disagreeable taste, its solubility in water, and the permanency of its composition give it an advantage over most of the other preparations of iron.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. viij. in the form of powder, pill, or solution; or made into a bolus with honey.

INCOMPATIBLES.—The mineral acids; and all astringent vegetable preparations.

FERRI ARSENIAS.—*Arseniate of iron.* This preparation may be obtained by the double decomposition of arseniate of soda and sulphate of protoxide of iron. When first precipitated it is of a white colour and is an arseniate of the protoxide of iron, but on exposure to the air even in the act of drying it rapidly alters, acquiring a pale greenish hue, and is converted into a mixture of arseniate of the protoxide and arseniate of the sesquioxide of iron. The arseniate of iron met with in the shops is a greenish coloured powder, perfectly insoluble; hydrochloric acid dropped on it changes it to a golden-yellow hue, and if thrown on live coals it emits the alliaceous odour of arsenic.

Arseniate of iron is a useful and active preparation, being more decidedly tonic than the other arsenical preparations; and is therefore especially adapted for the treatment of cutaneous diseases occuring in anemic persons. It may be given in pill in doses of 1-12th of a grain gradually increased to 1-8th of a grain three times daily.

FERRI BROMIDUM.—*Bromide of Iron.*

PREPARATION.—"Bromine; and clean iron filings, of each, equal parts; heat together under water till the fluid becomes of a greenish colour; filter and evaporate to dryness."—MAGENDIE.

Bromide of iron is of a brick-red colour, and has a disagreeable, styptic, metallic taste. It deliquesces rapidly when exposed to the air, and is very soluble in water. It has been used on the continent, it is stated with much success, in hypertrophy of the uterus, and in glandular enlargements; more recently it has been employed as a substitute for the iodide of iron. Dose, gr. iij. to gr. viij.

Pilulæ Ferri Bromidi, WERNECK. (Bromide of iron, ʒj.; extract of liquorice, a sufficiency; mix and divide into 60 pills.) One or two, morning and evening. It has been also employed externally in the form of ointment, prepared by rubbing together one part of the bromide and fifteen of prepared lard.

FERRI CARBONAS SACCHARATUM, D. L. E.—*Saccharine Carbonate of Iron.*

PREPARATION.—"Take of sulphate of iron, eight ounces; crystallized carbonate of soda of commerce, ten ounces; distilled water, two gallons; refined sugar in fine powder, four ounces. With the sulphate of iron, carbonate of soda, and water, prepare as directed for *Ferri carbonas*, a carbonate of iron, and immediately after it has been expressed, mix it with the refined sugar. Dry the mixture at a temperature not exceeding 212°, and having reduced it to a fine powder, preserve it in a well stopped bottle," D. "Sulphate of iron, ℥iv.; carbonate of soda, ℥iv. ʒij.; sugar, ℥ij.; boiling distilled water, Oiv.; dissolve the carbonate and the sulphate separately in two pints of water; mix the solutions while hot, and set aside that the carbonate of iron may subside; then having poured off the supernatant liquor, wash the precipitated carbonate frequently with water; add to it the sugar dissolved in two fluid ounces of water and evaporate the mixture in a water-bath to dryness; keep in a well stopped vessel," L. "Sulphate of iron, ℥iv.; carbonate of soda, ℥v.; pure sugar, ℥ij.; water, Oiv.; dissolve the sulphate and carbonate, each in Oij. of the water; add the solutions and mix them; collect the precipitate on a cloth filter, and immediately wash it with cold water, squeeze out as much of the water as possible, and without delay triturate the pulp which remains, with the sugar previously in fine powder. Dry the mixture at a temperature not much above 120°." E.

PHYSICAL PROPERTIES.—A grayish or bluish-green powder; inodorous, with a sweetish, strongly chalybeate taste.

CHEMICAL PROPERTIES.—This preparation is composed of "carbonate of protoxide of iron, in an undetermined state of combination, with sugar and sesqui-oxide of iron," *Edinburgh Pharmacopœia.* Sugar or other saccharine matter prevents the decomposition of the carbonate of the protoxide of iron, which takes place rapidly under ordinary circumstances from the conversion of the protoxide into the sesquioxide and the escape of carbonic acid. The saccharine carbonate remains unchanged for a long time, even when exposed to the air, but it eventually becomes converted into the sesquioxide; the Dublin and London colleges direct it to be dried at too high a temperature, a heat above 140° driving off most of the carbonic acid. It is insoluble in water or alcohol; but dissolves completely in hydrochloric acid with effervescence.

ADULTERATIONS.—This preparation is not liable to adulteration; that it has been properly prepared may be known by "its colour being grayish-green; and by its being easily soluble in muriatic acid, with brisk effervescence," *Edinburgh Pharmacopœia*. Dr. Christison states that when decomposed by an acid, fifty grains ought to yield 7·5 cubic inches of gas.

THERAPEUTICAL EFFECTS.—Carbonate of the protoxide of iron is one of the best and most active of the ferruginous salts, and the permanency of its composition in the form now described renders this preparation a valuable addition to the Materia Medica. It is peculiarly adapted for children and delicate females, when the employment of a chalybeate tonic is indicated. Carbonate of iron held in solution by an excess of carbonic acid is the active principle of many chalybeate mineral waters.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xxx. in the form of powder, or made into an electuary with syrup or honey.

Pilulæ Ferri Carbonatis, E. (Saccharine carbonate of iron, four parts; red-rose conserve, one part; beat them into a proper mass, to be divided into five grain pills.) Dose one to four pills.

In the following preparations, the carbonate of iron, prevented from undergoing decomposition by the presence of saccharine matter, is the active ingredient:—

Mistura Ferri composita, D. L. E. ("Take of myrrh, in powder, ʒj.; pure carbonate of potash, ʒss.; essence of nutmeg, fʒj.; rose water, f℥viij.; refined sugar, ʒj.; sulphate of iron, ʒss. Triturate the myrrh and carbonate of potash with the sugar, spirit of nutmeg, and seven ounces of the rose water, the latter being gradually added until a uniform mixture is obtained; to this add the sulphate of iron, previously dissolved in the remaining ounce of rose water, and enclose the mixture at once in a bottle, which should be tightly corked," D. "Myrrh, powdered, ʒij.; carbonate of potash ʒj.; rose water, f℥xviij.; sulphate of iron, powdered, ℈iiss.; spirit of nutmeg, f℥j.; sugar, ʒij.; rub together the myrrh with the spirit and the carbonate, and to these, while rubbing, add first the rose water with the sugar, then the sulphate. Put the mixture immediately into a glass vessel, and stop it," L. E.) This mixture, which was introduced into the pharmacopœias as a substitute for *Dr. Griffith's tonic mixture*, and by which name it is commonly known, is one of the best and most generally employed of the pharmaceutical preparations of iron. Its operation is stimulant as well as tonic, and consequently it should not be administered in cases where there is any tendency to inflammatory action in the digestive organs; the dose is f℥j. to f℥ij. two or three times a day. As it does not keep well, it should be only prepared when wanted for use.

Pilula Ferri composita, L. (Myrrh, powdered, ʒij.; carbonate of soda; sulphate of iron; and treacle, of each, ʒj.; rub the myrrh with the carbonate, in a vessel previously warmed; then add the sulphate of iron, and rub them again; afterwards beat the whole together to form a mass.) Dose, gr. x. to gr. xx. two or three times a day. These pills become so hard when kept, as to be unfit for use.

INCOMPATIBLES.—Acids, and acidulous salts; and all astringent vegetable preparations.

FERRI IODIDUM, D. E.—*Iodide of Iron. Proto-iodide of iron.* Iodide of iron has been omitted from the last edition of the London Pharmacopœia, but a formula for the Syrup introduced.

PREPARATION.—"Take of pure iodine, ℥j.; filings or thin turnings of wrought iron, separated from impurities by a magnet, ℥ss.; distilled water, f℥v. Introduce the iodine, iron, and four ounces of the water, into a Florence flask, and having heated the mixture gently for ten minutes, boil until the solution loses its red colour. Pass the liquid now through paper into a second flask, washing the filter with the remaining ounce of water, and by means of a regulated heat, boil down the liquor until a drop of it taken out on the end of an iron wire solidifies on cooling. When the flask has assumed the temperature of the air, let the iodide of iron be extracted from it (by breaking the flask if necessary), and after it has been submitted to powerful pressure, enveloped in blotting paper, let it be enclosed in a well-stopped bottle," D. "Take any convenient quantity of iodine, iron wire, and distilled water, in the proportions for making syrup of iodide of iron *(see below)*. Proceed as directed for that process; but before filtering the solution, concentrate it to one-sixth of its volume, without removing the excess of iron wire. Put the filtered liquor quickly into an evaporating basin, with twelve times its weight of quick-lime around the basin, in some convenient apparatus in which it may be shut up accurately in a small space not communicating with the general atmosphere. Heat the whole apparatus in a hot air-press or otherwise until the water be entirely evaporated; and preserve the dry iodide in small well-closed bottles," E. FERRI IODIDI SYRUPUS, D. L. E.—"Take of pure iodine, five drachms; iron turnings, separated by a magnet, three drachms; distilled water, two ounces; simple syrup, six fluid ounces: introduce the iodine, iron, and water into a glass flask, and apply a moderate heat until the solution loses its red colour. Filter the solution while hot into a bottle containing the syrup, mix with agitation, and add distilled water, to make up eight fluid ounces. One fluid drachm contains about five grains of iodide of iron," D. "Iodine, ℥j.; iron wire, ʒiij.; distilled water, f℥xij. or a sufficiency; sugar, ℥x.; mix the iodine and iron with eight fluid ounces of the water, and heat until the liquor assumes a greenish colour, then strain; evaporate to about four fluid ounces and add the sugar: finally when the syrup has cooled, add sufficient water that the whole may measure fifteen ounces; keep in a well-stoppered black glass vessel," L. "Iodine (dry), 200 grains; fine iron wire, recently cleaned, 100 grains; white sugar, in powder, ʒivss.; distilled water, f℥vj.; boil the iodine, iron, and water together in a glass matrass, at first gently, to avoid the expulsion of iodine vapour, afterwards briskly till about f℥ij. remain. Filter this quickly, while hot, into a matrass containing the sugar; dissolve the sugar with a gentle heat, and add distilled water to make up f℥vj. Twelve minims contain one grain of iodide of iron," E. The following simple process for preparing iodide of iron has been recently proposed by M. Cap:—Bruise together in a large mortar, 4 parts of iodine and 2 parts of water; then add quickly 1 part of iron filings. Sufficient heat is produced to drive off 1 part of iodine in the state of vapour, when the mixture becomes liquid; to remove the excess of iron, it is to be dissolved in water and filtered. The filtered liquor is a solution of the iodide of iron free from oxide or per-oxide. This solution may be readily preserved by adding a sufficiency of pure sugar to it, to convert it into a syrup.

PHYSICAL PROPERTIES.—Generally met with in small crystalline masses, of an iron-gray colour, opaque, and having a metallic lustre. It has a very styptic metallic taste.

CHEMICAL PROPERTIES.—Iodide of iron is composed of 1 equivalent of iodine and 1 of iron (Fe I), combined in the crystalline state with 4 equivalents of water. It is very deliquescent, and attracting oxygen from the air is coverted into a mixture of sesqui-oxide and sesqui-iodide of iron; it dissolves readily in water and alcohol, but the solution when left exposed to the air is rapidly decomposed, and sesqui-oxide of iron deposited; which change is, however, prevented if a sufficient quantity of sugar be present. Exposed to heat, it fuses, and at a temperature above 350° F., is decomposed, the iodine being volatilized and the iron left in the state of peroxide. The formula of the Dublin Pharmacopœia yields an excellent preparation; it is that proposed by Messrs. Smith, of Edinburgh.

ADULTERATIONS.—That iodide of iron has been well prepared and properly preserved, may be readily known by its being entirely soluble in distilled water. Owing to the difficulty of preserving this salt, the London College directs the syrup alone to be now prepared for use in medicine, but as many persons can take it only in the solid state, this is a defect in the last edition of the London Pharmacopœia, the more especially as the iodide may be preserved in well stoppered bottles for an almost indefinite period, provided it be kept covered with a layer of the *Pulvis Ferri.*

THERAPEUTICAL EFFECTS.—Iodide of iron was first employed in the practice of medicine by the late Dr. A. T. Thomson. In its operation on the system it is more nearly allied to the preparations of iron than to those of iodine, but to a certain extent it possesses the combined properties of both. Thus, as a tonic it is especially useful in scrofulous debility, and under its use strumous enlargements of the glandular system are quickly dissipated. It may be also administered with much benefit in chlorosis and amenorrhœa when the ferruginous preparations are indicated, and it is probably one of the most useful remedies that can be employed in the treatment of secondary syphilitic affections, occurring in scrofulous or weak constitutions. I have found it very beneficial in several forms of cutaneous disease occurring in debilitated habits, and in many cases of phthisis, in either of which the syrup may be combined with cod-liver oil. In large doses iodide of iron sometimes purges.

DOSE AND MODE OF ADMINISTRATION.—The dose of iodide of iron is gr. ij. to gr. v. gradually increased. It is so deliquescent a substance, and when dissolved decomposes so rapidly, that many methods have been proposed for preserving its solution unchanged; of these the only two that deserve notice are, keeping in the bottle in which it is contained a piece of iron wire as first proposed by Mr. Squire of London, or forming it into a strong syrup as recommended by Dr. A. T. Thomson. The former method has been found very effectual, but it entails the necessity of filtering the solution every time it is to be used; while in the latter it is not only preserved for a length of time unaltered, but it is also an elegant form for the administration of the medicine. The syrups of the three Pharmacopœias are of equal strength, fʒj. containing five grains of the salt; the dose is therefore from min. xij. to min. xl.

Pilulæ Iodidi Ferri, (Take of iodine, 127 grains; iron wire about the thickness of a thin quill, ℥ss.; distilled water, min. lxxv. Agitate them briskly together in a strong ounce phial, provided with a well fitted glass stopper, until the froth which forms becomes white, which will happen in less than ten minutes. Pour the liquid upon ʒij. of finely powdered loaf sugar, in a small mortar, and triturate immediately and briskly for a few minutes; add gradually a mixture of the following powders, viz., liquorice powder, ℥ss.; powder of gum arabic, ʒiss.; and flour, ʒj.; divide the mass into 144 pills. In making this preparation, the bottle should be wrapped in a coarse towel, for fear of its bursting, and the stopper held in firmly. Each pill contains one grain of iodide of iron.) The above formula, which was originally communicated by Mr. Leslie of Glasgow, is that which has been in general use for several years; but I have found that when kept for some time, the pills become very soft and lose all trace of iodine. I have therefore tried the following, which makes an excellent pill, not nearly so large as the above, and by means of which any desired number of pills may be prepared in a few minutes, thereby rendering their being too long kept unnecessary:—Pulvis ferri, gr. vj.; sugar of milk, gr. vj.; iodide of iron, gr. xij.; confection of the dog-rose, gr. xij.; make into a mass and divide into 12 pills. Each of these pills contains one grain of the iodide of iron and half a grain of the powder of iron.

INCOMPATIBLES.—Acids, and acidulous salts; and all substances incompatible with sulphate of iron, (see page 72.)

FERRI LACTAS.—*Lactate of Iron. Proto-lactate of Iron.*

PREPARATION.—"Take any quantity of sour whey; evaporate it to a third or fourth of its volume; decant, filter, and saturate with milk of lime. Separate the precipitated lactate of lime on a filter; treat it with solution of oxalic acid to precipitate the oxalate of lime. Add to the liquor, again filtered (which is now a solution of lactic acid) clean iron filings; boil for a short time, filter, evaporate to the consistence of a syrup and crystallize by cooling."—LOURADOUR.

PHYSICAL PROPERTIES.—Lactate of iron occurs in the form of small greenish-yellow acicular prisms, or in powder of a dull, pale green colour, having a feeble chalybeate, not disagreeable taste, but no odour.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of protoxide of iron and 1 of lactic acid, combined in the crystalline state with 3 of water. It is but slightly soluble in water, and during solution the iron passes to a higher state of oxidation; when pure, the solution in distilled water is not affected by solution of nitrate of baryta or of oxalate of ammonia. Proto-lactate of iron has an acid reaction on vegetable colours.

THERAPEUTICAL EFFECTS.—Lactate of iron has been administered in the same cases as the other mild preparations of this metal. It has been principally used in the treatment of chlorosis and atonic amenorrhœa, in which it has been found very successful. In consequence, however, of its high price, it has been hitherto but little employed in this country.

DOSE AND MODE OF ADMINISTRATION.—Gr. vj. to gr. xij. in the 24 hours. It is best given in the form of lozenge or of syrup.

Trochisci Ferri Lactatis, CAP. (Lactate of iron, ʒvij. gr. lxxii. ; pure sugar, ℥xiss. ; mucilage, a sufficiency ; make into lozenges, each weighing gr. x.) Each lozenge contains gr. $\frac{3}{4}$ of the salt.

Syrupus Ferri Lactatis, CAP. (Lactate of iron, ʒj. ; boiling distilled water, f℥viss. ; pure sugar, ℥xiij. ; make into a syrup.) Dose, fʒij. to f℥ss.

INCOMPATIBLES.—Same as for the ammonio-citrate of iron.

FERRI MISTURA AROMATICA, D. *Aromatic mixture of Iron.*

PREPARATION.—Take of peruvian bark (crown or pale), in powder, ℥j. ; calumba root, in coarse powder, ʒiij. ; cloves, bruised, ʒij. ; filings of iron, separated by a magnet, ℥ss. ; digest for three days, with occasional agitation, in a covered vessel, with as much peppermint water as will give twelve ounces of a filtered product, and then add of compound tincture of cardamoms, three fluid ounces ; tincture of orange peel, three fluid drachms. This mixture should be kept in a well stopped bottle.

This mixture is a combination of aromatic tonics holding in solution some tannate of iron; in consequence of its black colour it is commonly known as *Heberden's ink*. Notwithstanding its being an unchemical compound, it is a most excellent tonic, and so highly thought of as to be retained in the last edition of the Dublin Pharmacopœia ; it is in very general use in this city, in the various states of debility attended with anemia. Dose, f℥j. to f℥ij. two or three times a day. It may be conveniently and advantageously prescribed in combination with the compound iron mixture, equal proportions of each being used.

FERRI MURIATIS TINCTURA, E. TINCTURA FERRI SESQUICHLORIDI, D. L.—*Tincture of the muriate of Iron. Tincture of the sesquichloride of Iron.*

PREPARATION.—"Take of iron wire, ℥viij. ; pure muriatic acid, Oij. ; pure nitric acid, fʒxviij. ; distilled water, Oj. ; rectified spirit, Oiss. Dilute the muriatic acid with the water, and having poured the mixture on the iron, apply a gentle heat until the metal is dissolved. Next add the nitric acid in successive portions, and then evaporate at a gentle heat until the solution is reduced to one pint. Finally mix this in a bottle with the spirit, and, after the mixture has stood for twelve hours, draw off the clear tincture. The specific gravity of this tincture is 1237," D. "Sesqui-oxide of iron, ℥vj. ; hydrochloric acid, Oj. ; rectified spirit, Oiij. ; mix the sesqui-oxide with the acid and digest in a sand-bath, frequently agitating until it is dissolved, then add the spirit to the cooled solution and filter," L. "Red oxide of iron, ℥vj. ; muriatic acid, Oj. ; rectified spirit, Oiij. ; digest the oxide in the acid for three days in a glass vessel, with occasional agitation ; then add the spirit and filter," E.

PHYSICAL PROPERTIES.—This preparation is transparent and of a reddish-brown colour, it has rather an agreeable odour of hydrochloric ether, and a very acid styptic taste.

CHEMICAL PROPERTIES.—It is a solution of sesqui-chloride of iron in rectified spirit, containing also free hydrochloric acid, and a trace of hydrochloric ether. It reddens litmus paper strongly. When prepared according to the London formula, "its specific gravity is about ·992, and f℥j. yields, on the addition of potash, a precipitate of nearly gr. xxx. of sesquioxide of iron."

THERAPEUTICAL EFFECTS.—Tincture of the sesqui-chloride of iron if taken in large doses acts as an irritant poison, principally in consequence of the free hydrochloric acid which it contains. In medicinal doses it is one of the most generally employed of the officinal preparations of iron, and may be used as a tonic in the cases in which this metal is indicated. It should be borne in mind, however, that it possesses astringent properties, on which account it is sometimes used as a topical agent to check bleeding from small vessels, and also that it is more irritant than the other preparations of the metal. Besides its tonic powers, it has some specific influence over the urinary organs, in many diseases of which it is employed with benefit. Thus it is found useful in irritability of the bladder, especially when occurring in females, in chronic mucous discharges from the urino-genital organs, in atonic hemorrhages from the kidneys and bladder, and in spasmodic stricture of the urethra preventing the introduction of a catheter. In the latter affection, its beneficial effects are generally ascribed to the nausea which it produces, and consequently it is administered in small but frequently repeated doses, min. x. to min. xij. every ten or fifteen minutes. Of late years tincture of the sesqui-chloride of iron has been administered with very successful results in the treatment of erysipelas ; and in a recent communication to the *Dublin Quarterly Medical Journal* Dr. Heslop of Birmingham states that he has found it most useful in the late epidemic of diphtheria, and analogically suggests its employment in puerperal peritonitis and allied diseases.

DOSE AND MODE OF ADMINISTRATION.—Min. x. to fʒss. gradually increased to fʒj. or fʒij. ; it is best administered in f℥j. or f℥ij. of water, or in white wine if nothing forbids the use of the latter ; it may be also given in infusion of quassia.

INCOMPATIBLES.—The alkalies, and their carbonates; lime water; carbonate of lime; magnesia and its carbonate; solution of gum; and all astringent vegetable preparations.

In poisoning with this preparation, the treatment is the same as in poisoning with hydrochloric acid, (see page 157.)

FERRI OXYDUM MAGNETICUM, D. FERRI OXIDUM NIGRUM, E. —*Magnetic oxide of Iron. Black oxide of Iron. Ferroso-ferric-oxide of Iron.*

PREPARATION.—"Take of sulphate of iron, ℥xij.; solution of caustic potash, f℥liv.; distilled water, a sufficient quantity: convert as is directed in the formula for *Ferri Peroxydum Hydratum*, eight ounces of the sulphate of iron into a persulphate. To the solution thus obtained add the four remaining ounces of the sulphate of iron first dissolved in half a pint of distilled water. Mix well the resulting liquid with the solution of caustic potash, and, having boiled for five minutes in an iron vessel, collect the precipitate on a calico filter, and wash it with boiling distilled water until the liquid which passes through ceases to give a precipitate when dropped into a solution of chloride of barium. Lastly let the precipitate be dried by a steam or water heat and having been first reduced to a fine powder, let it be enclosed in a well-stopped bottle," D. "Sulphate of iron, ℥vj.; sulphuric acid (commercial), fʒij. f℈ij.; pure nitric acid, fʒivss.; stronger aqua ammonia, f℥iiss.; boiling water, Oiij.; dissolve half the sulphate in half the water, and add the sulphuric acid; boil, add the nitric acid by degrees, boiling the liquid briskly after each addition for a few minutes. Dissolve the rest of the sulphate in the rest of the water, mix thoroughly the two solutions, and immediately add the ammonia in a full stream, stirring the mixture at the same time briskly. Collect the black powder on a calico filter, wash it with water till the water is scarcely precipitated by solution of nitrate of baryta, and dry it at a temperature not exceeding 180°," E.

PHYSICAL PROPERTIES.—This compound is met with native, when it constitutes *magnetic* iron ore. Prepared according to the directions of the pharmacopœias, it is a grayish black powder with a velvety smoothness. It is strongly magnetic.

CHEMICAL PROPERTIES.—Magnetic oxide of iron is a compound of 1 equivalent of the protoxide and 2 of the sesquioxide of iron, ($Fe\,O,\ 2\,Fe^2\,O^3$.) Exposed to heat in close vessels it undergoes no alteration, but when heated in the open air it absorbs oxygen, and passes into the state of sesquioxide. It dissolves readily in hydrochloric acid without effervescence.

ADULTERATIONS.—Black oxide of iron sometimes contains metallic iron, when it does not dissolve completely in hydrochloric acid.

THERAPEUTICAL EFFECTS.—This preparation of iron is not much used in the present day, but formerly under the name of *Æthiops martis*, it bore a high reputation as a chalybeate tonic.

DOSE AND MODE OF ADMINISTRATION.—The dose of it is from gr. v. to gr. xx. two or three times a day, made into an electuary with honey or treacle.

Ferruginous pills, SCHNEIDER. (Black oxide of iron, in fine powder, 15 parts; calumba and canella, of each, in fine powder, 4 parts; cayenne pepper, 1 part; extract of chamomile, a sufficiency; make into a pill mass and divide into four grain pills.) Dose, 3 to 5 daily. An excellent combination in chlorosis.

FERRI PEROXYDUM, D. FERRI SESQUIOXYDUM, L. FERRI OXIDUM RUBRUM, E.—*Peroxide of Iron. Sesquioxide of Iron. Red oxide of Iron.*

FERRI CARBONAS, D.—*Carbonate of Iron.* As most of the carbonic acid is driven off during the drying of the carbonate, as directed by the Dublin College, and as the small quantity it retains escapes soon after it has been prepared, no matter how carefully it may be preserved,—the resulting powder being the sesquioxide, I have thought it better to describe it along with the sesquioxide of iron.

PREPARATION.—FERRI PEROXYDUM, D.—"Take of hydrated peroxide of iron, any convenient quantity: place it in an oven, on a few folds of filtering paper, and when it has become dry to the touch, transfer it to a covered crucible, and expose it for a few minutes to an obscure red heat." FERRI SESQUIOXYDUM, L.—"Sulphate of iron, ℔iv.; carbonate of soda, ℔iv. ℥ij.; boiling water, cong. vj.; dissolve the sulphate and carbonate separately in cong. iij. of water; then the liquors being mixed together while hot, set them by that the powder may subside. Lastly, the supernatant liquor being poured off, wash what is precipitated frequently with water and dry it." FERRI OXIDUM RUBRUM, E.—"Sulphate of iron, ℥iv.; carbonate of soda, ℥v.; boiling water, Oss.; cold water, Oiiiss.; dissolve the sulphate in the boiling water; add the cold water, and then the carbonate of soda previously dissolved in about thrice its weight of water. Collect the precipitate on a calico filter, wash it with water till the water is but little affected by solution of nitrate of baryta; and dry it in the hot air press or over the vapour bath." FERRI CARBONAS, D.—"Take of sulphate of iron, ℥viij.; crystallized carbonate of soda of commerce, ℥x.; distilled water, cong. ij.: dissolve each salt in one half of the water, and both solutions being raised to the boiling temperature, mix them, and set the whole to rest in a covered vessel for six hours. The supernatant solution having been drawn off with a syphon, the precipitate is to be drained on a calico filter, and then subjected to strong expression. Finally let it be dried at a temperature not exceeding 212°, pulverized, and preserved in a well-stopped bottle."

PHYSICAL PROPERTIES.—The sesquioxide of iron is when first prepared of a light reddish-brown colour, but becomes dark brown when dried; the carbonate of the Dublin Pharmacopœia is of a reddish chocolate brown colour. Both are tasteless and odourless.

CHEMICAL PROPERTIES.—Sesquioxide of iron is composed of 2 equivalents of iron, and 3 of oxygen, ($Fe^2 O^3$.) It is insoluble in water, and is not readily dissolved by any acid except the hydrochloric, in which it dissolves freely, and if it be free from carbonic acid without effervescence.

ADULTERATIONS.—If it contain any earthy impurity, as brick dust, it will not be completely soluble in hydrochloric acid, aided by a gentle heat. The following are the characteristics and tests given for it in the last edition of the London Pharmacopœia:—"Soluble in dilute hydrochloric acid with scarcely any effervescence, and is thrown down from it on the addition of potash; the solution then strained is colourless, and no colour is produced in it on the addition of hydrosulphuric acid or ferro-cyanide of potassium."

THERAPEUTICAL EFFECTS.—Sesquioxide of iron may be used as a chalybeate tonic in the same cases as the other ferruginous preparations. Its principal use, however, is in the treatment of neuralgic affections, particularly tic-douloureux, as a remedy for which it was first proposed under the old name of *Carbonate*, by Mr. Hutchinson. In many instances it will be found to give complete relief, but it frequently fails to prove of the least service. The late Mr. Carmichael of this city highly recommended this preparation as a useful palliative in cancerous diseases.

DOSE AND MODE OF ADMINISTRATION.—The sesquioxide of iron is administered in doses of from ʒss. to ʒiv. three or four times a day. It may be given in the form of electuary made with honey, and some aromatic powder combined with it.

Emplastrum Ferri, D. L. E. ("Peroxide of iron, in fine powder, ℥j.; Burgundy pitch, ℥ij.; litharge plaster, ℥viij.; add the peroxide of iron to the Burgundy pitch and litharge plaster, previously melted together, and stir the mixture constantly until it stiffens on cooling," D. "Sesquioxide of iron, ℥j.; lead plaster, ℥viij.; prepared frankincense, ℥ij.; the plaster and frankincense being melted together over a slow fire sprinkle in the sesquioxide and mix," L. "Litharge plaster, ℥iij.; resin, ʒvj.; olive oil, fʒiiss.; bees' wax, ʒiij.; red oxide of iron, ℥j.; triturate the oxide of iron with the oil, and add the mixture to the other articles previously melted with a gentle heat; mix the whole thoroughly," E.) These plasters are employed with good effect, to give mechanical support in muscular relaxations and weakness of the joints; over the stomach in flatulent dyspepsia, and over the region of the heart in nervous palpitation.

INCOMPATIBLES.—The mineral acids; and acidulous salts.

FERRI PERCYANIDUM.—*Percyanide of Iron. Prussian Blue.* This substance was introduced into the Materia Medica list of the London Pharmacopœia, from the last edition of which it has been omitted, as being solely used for preparing bicyanide of mercury. It has been, however, employed in America in the treatment of intermittent and remittent fevers, and in dysentery; for which it is stated to have proved a very effectual remedy. It has been also used in Germany, it is said with success, in some cases of old standing epilepsy. But according to more recent observations, it appears to possess very little, if any, therapeutical power. The dose in which Prussian blue has been administered is from gr. iij. to gr. vj. three or four times a day.

FERRI PHOSPHAS.—*Phosphate of Iron.*

PREPARATION.—Take of sulphate of iron, ℥v.; phosphate of soda, ℥vj.; water, cong. j. Dissolve the sulphate of iron and phosphate of soda separately in Oiv. of the water; then mix the solutions; and set the mixture by that the powder may subside; lastly having poured off the supernatant liquor, wash the phosphate of iron with hot water, and dry it with a gentle heat.

PROPERTIES.—Phosphate of iron is in the form of a fine bluish or greenish-white powder. It has a ferruginous taste, but no odour. According to Berzelius, it is a compound of the phosphates of the proto- and sesqui-oxides of iron. It is insoluble in water.

THERAPEUTICAL EFFECTS.—Phosphate of iron possesses the tonic properties of the other ferruginous preparations; it is so rarely used, however, in the present day, that it is not contained in the British or French Pharmacopœias. It appears to me to be peculiarly adapted for those scrofulous affections of children in which there is softening of the osseous system, and for rickets. In America it is employed in amenorrhœa and in some forms of dyspepsia.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. x. in powder or made into pill with extract of liquorice.

FERRI SULPHAS.—*Sulphate of Iron* (described in the division *Astringents)*, is an excellent tonic, and is employed with much benefit in the same cases as the other ferruginous compounds, provided its astringent property does not contra-indicate its use. I have found the dried sulphate (see page 72), combined with the pill of aloes and myrrh, productive of excellent effects in the treatment of chlorosis.

FERRI TARTRAS.—*Tartrate of Iron.*

A preparation often met with in the shops under this name is the *ammonio-tartrate* described before. In former editions of the British Pharmacopœias, a wine of iron, *Vinum Ferri* was contained, and as it is still frequently prescribed, has been introduced into their last edition by the London College.

Vinum Ferri, L. (Iron wire, ℥j.; sherry wine, Oij.; digest for thirty days and filter.) The following formula by M. Soubeiran yields a much more elegant preparation:—"Tartrate of protoxide of iron, 1 part; tartaric acid, 1 part; white wine, 1000 parts. Rub the tartrate of iron and tartaric acid together in a porcelain or glass mortar; then add the white wine, and filter the solution if necessary. Tartrate of protoxide of iron is readily prepared, by decomposing an equivalent of proto-sulphate of iron with an equivalent of neutral tartrate of potash, instantly washing the precipitate with water, collecting it on a strainer, pressing it strongly and drying over a water bath." The dose of iron wine is from fʒj. to f℥ss. Both preparations contain the iron in the state of tartrate with traces of the malate and probably the acetate.

FERRUGO, E. FERRI PEROXYDUM HYDRATUM, D.—*Hydrated Sesquioxide of Iron.*

PREPARATION.—" Take of sulphate of iron, ℥viij. ; pure sulphuric acid, fʒvj. ; pure nitric acid, f℥ss. ; solution of caustic potash, Oij. ; distilled water, f℥xij, : to ten ounces of the water add the sulphuric acid, and in the mixture with the aid of heat dissolve the sulphate of iron. Mix the nitric acid with the remainder of the water, and, having added the diluted acid to the solution of sulphate of iron, concentrate by boiling, until, upon the sudden disengagement of much gas, the liquid passes from a dark to a red colour. Let this be now poured into the solution of caustic potash, and, when the mixture has been well stirred, place it on a calico filter, and let the precipitate be washed with distilled water, until the liquid which passes through ceases to give a precipitate when dropped into a solution of chloride of barium. Lastly, enclose the precipitate, while in the pasty state, in a porcelain pot whose lid is made air-tight by a luting of lard, so as to prevent the loss of water by evaporation," D. " Sulphate of iron, ℥iv. ; sulphuric acid (commercial), fʒiiiss. ; nitric acid (Dens. 1380), fʒix. ; stronger aqua ammoniæ, fʒiiiss. ; water, Oij. ; dissolve the sulphate in the water, add the sulphuric acid, and boil the solution ; add then the nitric acid in small portions, boiling the liquid for a minute or two after each addition, until it acquires a yellowish-brown colour and yields a precipitate of the same colour to ammonia. Filter ; let the liquid cool ; and add in a full stream the aqua ammoniæ, stirring the mixture briskly. Collect the precipitate on a calico filter, wash it with water until the washings cease to precipitate with nitrate of baryta ; squeeze out the water as much as possible ; and dry the precipitate at a temperature not above 180°. When this preparation is kept as an antidote for poisoning with arsenic, it is preferable to preserve it in the moist state after being simply squeezed," E.

A hydrated peroxide of iron may be also readily prepared by precipitating the tincture of the muriate with ammonia.

PROPERTIES.—The hydrated sesquioxide of iron is in the form of a yellowish-brown powder, inodorous and tasteless. It is composed of 1 equivalent of sesquioxide of iron and 2 of water ($Fe^2 O^3 + 2HO$). It is insoluble in water, but dissolves readily in dilute acids ; heated it gives off water and a little ammonia, and the red peroxide of iron is left. If in the moist state the hydrated sesquioxide of iron in considerable excess (*at least* 12 *parts of oxide to* 1 *part of arsenic*, Dr. Maclagan), be agitated with a solution containing arsenious acid, a very insoluble compound (*arsenite of protoxide of iron*, Graham) is formed, and the filtered liquid gives no trace of arsenious acid.

THERAPEUTICAL EFFECTS.—In its medical properties this preparation is precisely similar to the dry sesqui-oxide. It has been advisedly introduced into the last editions of the Dublin and Edinburgh Pharmacopœias, as being the most certain antidote for poisoning with arsenic which has been yet discovered. Its antidotal powers are now well established by the result of numerous cases in which it has proved successful within the last twenty years, both in this country and on the continent. The quantity required to neutralize the poisonous property of arsenic, as above remarked, is at least 12 parts to 1 of the poison, but it should be always given in as large doses as the stomach will bear. Thus, a tablespoonful may be mixed with water, and this quantity administered every five or ten minutes. Hydrated sesquioxide of iron does not prove nearly so efficacious an antidote when dried, as when kept in the form of a moist magma.

FERRUM TARTARIZATUM, D. E. FERRI POTASSIO-TARTRAS, L.—*Tartrate of Iron and Potash. Potassio-tartrate of Iron. Ferric-tartrate of Potash.*

PREPARATION.—"Take of sulphate of iron, ℥viij.; white bitartrate of potash, ℥v.; distilled water, Oiss.: from the sulphate of iron prepare hydrated peroxide of iron, by the process given before, and having immediately after it is washed, placed it with the bitartrate of potash and water in a porcelain capsule, apply heat to the mixture (taking care, however, that the temperature does not rise beyond 150°) and stir it occasionally for six hours. Let the solution, after it has cooled down to the temperature of the atmosphere, be decanted off any undissolved oxide of iron, and, having transferred it in small quantities to delf dinner-plates, let it be evaporated to dryness at a heat not exceeding 150°. Lastly chip off the film of dry salt which adheres to the plates, and preserve it in well-stopped bottles," D. "Sulphate of iron, ℥iv.; sulphuric acid, f℥ss.; nitric acid, f℥j.; solution of ammonia, f℥x.; bitartrate of potash, powdered, ℥ij.; distilled water, cong. iv.; dissolve the sulphate with the sulphuric acid in a pint of the water; then having applied heat gradually add the nitric acid; boil down the liquor to the consistence of a syrup and mix with the remainder of the water; then add ammonia to precipitate the sesquioxide of iron; wash the precipitate and set aside for twenty-four hours; then having mixed the bitartrate with half a pint of distilled water heat the solution to 140°, and add to it gradually the sesquioxide of iron from which the supernatant liquor had been poured off; separate on a linen filter that portion of the sesquioxide which cannot be dissolved, and evaporate the clear solution to dryness. The potassio-tartrate of iron may be also dried in a similar manner as the ammonio-citrate of iron," L. "Sulphate of iron, ℥v.; bitartrate of potash, ℥v. ʒj.; carbonate of ammonia, in fine powder, a sufficiency. Prepare rust of iron from the sulphate as directed for *Ferrugo*, and without drying it. Mix the pulpy mass with Oiv. of water; add the bitartrate; boil till the rust of iron is dissolved; let the solution cool; pour off the clear liquid, and add to this the carbonate of ammonia so long as it occasions effervescence. Concentrate the liquid over the vapour bath to the consistence of thin extract, or till the residuum becomes on cooling a firm solid; which must be preserved in well closed vessels," E.

PHYSICAL PROPERTIES.—This salt occurs in the form of a grayish brown powder with a greenish tint, or in thin yellowish-brown curled scales when dried like the ammonio-citrate of iron; it is inodorous, but has a somewhat styptic, not disagreeable taste.

CHEMICAL PROPERTIES.—The tartrate of iron and potash when prepared, as in the formula of the three British Pharmacopœias, with the sesquioxide of iron, is according to Wittstein, a compound of 4 equivalents of tartrate of potash, 1 of the tartrate of the protoxide of iron, 3 of the sesquioxide of iron, and 1 of tartaric acid, $(4\,(KO + T) + (Fe\,O + T) + 3\,Fe^2\,O^3 + \overline{T})$; or according to Phillips of 1 equivalent of neutral tartrate of potash, and 1 equivalent of basic tartrate of sesquioxide of iron. It attracts water in damp air but does not deliquesce; is soluble in water, requiring about 4 parts of cold water for its solution; and is slightly soluble in weak spirit. The solution is of a greenish yellow colour; is not decomposed by the alkalies or alkaline carbonates, unless with the aid of heat; and retains its composition unchanged for a considerable time.

ADULTERATIONS.—As met with in the shops, tartrate of iron and potash is often imperfectly prepared, the oxide of iron not being chemically combined with the bitartrate of potash. The tests of the *Edinburgh Pharmacopœia* will detect this as well as other faults which are likely to occur in the preparation:—"Entirely soluble in cold water; taste feebly chalybeate; the solution is not altered by aqua potassæ, and is not precipitated by solution of ferrocyanide of potassium." I have in several instances met with specimens of this salt which contained carbonate of potash; they were exceedingly deliquescent and effervesced with dilute acids. The following are the characteristics and tests given for the potassio-tartrate of iron in the last edition of the London Pharmacopœia:—"Soluble in water; the solution does not change the colour of either litmus or turmeric; nor does it become blue on the addition of ferrocyanide of potassium; nor precipitate with any alkali; but if it be heated with potash, about 34 grains of sesquioxide of iron are thrown down from 100 grains."

THERAPEUTICAL EFFECTS.—This is a mild chalybeate tonic, and may be used in all cases where the milder preparations of iron are indicated; indeed by many practitioners it is preferred to any other, from a belief that it is more readily assimilable by the digestive organs. In consequence of its taste, the potassio-tartrate of iron is well adapted for children.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. three or four times a day, made into a bolus with honey or treacle, or dissolved in some aromatic water.

INCOMPATIBLES.—The mineral acids; lime water; and all astringent vegetable preparations.

GENTIANA, L. E. GENTIANA LUTEA, RADIX, D.—*Gentian. Root of Gentiana lutea.* A native of the mountainous regions of central Europe; belonging to the Natural family *Gentianaceæ,* and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—Root, perennial; Stem, annual, simple, erect, 3–4 feet high, roundish, hollow; Leaves, opposite, broad, ovate, 5–7 nerved, plaited; Flowers, yellow, whorled, numerous, on smooth peduncles; Fruit, a conical capsule, 2-valved, many-seeded.

PHYSICAL PROPERTIES.—Gentian root is imported in bales from Switzerland, by way of Havre, Marseilles, &c. It is in pieces varying in length from two or three to eight or ten inches, and from half an inch to one or two inches in thickness, usually contorted and much branched; the epidermis is wrinkled and somewhat annulated, of a brownish-yellow colour; internally the root is of a bright yellow colour, and has a spongy texture. It has a faint aromatic odour, which in the fresh state is said to be strong and disagreeable, and an intensely bitter taste, void of all astringency.

CHEMICAL PROPERTIES.—Gentian consists of odorous volatile oil, a yellow crystallizable bitter neutral principle (*gentianin* of M. M. Henry and Caventou, but which, according to Leconte and Trommsdorff, is a compound of simple colouring matter not bitter—*gentisin*, a bitter principle—*gentianite*, and a fatty matter,) a substance identical with bird-lime, a green fixed oil, a free organic acid, uncrystallizable sugar, gum, yellow colouring matter, and lignin. Gentian imparts its active principles readily to cold or boiling water, alcohol, and ether.

ADULTERATIONS.—The roots of other species of gentian are frequently mixed with those of *Gentiana lutea*, an adulteration of little importance, as for the most part they possess analogous properties. A more serious fraud has been, however, sometimes practised, that of mixing the roots of belladonna, monkshood, or white hellebore with gentian; they may be readily detected, as they do not possess either the intense bitter taste or the bright yellow colour internally of gentian root. In France powdered gentian root is very commonly adulterated with yellow ochre, as much as 50 per cent. being often mixed with it. The fraud may be detected by boiling a small quantity of a suspected specimen for a few minutes with very dilute sulphuric acid, filtering, and testing the filtered liquor with tincture of galls; if any ochre had been present, a blackish precipitate will be produced.

THERAPEUTICAL EFFECTS.—Gentian is an excellent pure bitter tonic, and is one of the most commonly employed of this class of medicines. In large doses it often causes vomiting, and it has a tendency to relax the bowels. The diseases in which gentian is employed with most benefit are those forms of dyspepsia attended with torpid digestion and secretion of acid, but unaccompanied by any tendency to irritability or inflammation of the stomach. It is also a useful tonic in the debility attendant on chronic diseases; and in consequence of its bitterness it proves anthelmintic.

DOSE AND MODE OF ADMINISTRATION.—In powder, seldom used, gr. x. to gr. xxx.; as gentian possesses little if any aroma, aromatics are usually prescribed in combination with it.

Infusum Gentianæ compositum, D. L. *Infusum Gentianæ*, E. ("Take of gentian root, bruised; orange-peel, dried, of each ʒij.; boiling water, Oss.: infuse for one hour in a covered vessel, and strain. The product should measure about eight ounces," D. "Gentian, sliced; orange-peel, dried, of each, ℥ij.; lemon-peel, ʒiv.; boiling distilled water, Oj.; macerate for an hour in a covered vessel, and strain," L. "Gentian, sliced, ℥ss.; bitter orange-peel, dried and bruised, ʒj.; coriander, bruised, ʒj.; proof spirit, f℥iv.; cold water, f℥xvj.; pour the spirit on the solids; in three hours add the water; in twelve hours more strain through linen or calico," E.) The Edinburgh preparation keeps best, but the spirit it contains will in many cases render its use objectionable. The infusion of the Dublin and London Colleges soon spoils by keeping, it should therefore be only prepared when required for use. Dose, f℥ss. to f℥ij. Infusion of gentian is an excellent vehicle for the alkaline bicarbonates.

Mistura Gentianæ composita, L. (Compound infusion of gentian, f℥xij.; compound infusion of senna, f℥vj.; compound tincture of cardamoms, f℥ij.; mix.) An excellent cathartic in constipation attended with debility of the digestive organs. Dose, f℥j. to f℥ij.

Tinctura Gentianæ composita, D. L. E. ("Gentian root, bruised, ℥iij.; bitter orange-peel, dried, ℥iss.; cardamom seeds, bruised, ℥ss.; proof spirit, Oij.; macerate for fourteen days, strain, express, and filter," D. "Gentian, sliced, ℥iiss.; orange-peel, dried, ʒx.; cardamoms, bruised, ʒv.; proof spirit, Oij.; macerate for seven days, express and filter," L. "Gentian, sliced and bruised, ℥ij.; dried bitter orange-peel, bruised, ℥j.; canella in moderately fine powder, ℥ss.; cochineal, bruised, ʒss.; proof spirit, Oij.; digest for 7 days, strain, and express strongly; and then filter the liquor. This tincture may be more conveniently prepared by percolation, as directed for the compound tincture of cardamom," E.) Dose, fʒj. to fʒij.; generally used as an adjunct to the infusion.

Tinctura Rhei et Gentianæ, E. (Rhubarb, in moderately fine powder, ʒij.; gentian, finely cut or in coarse powder, ℥ss.; proof spirit, Oij.; mix the powders and proceed as directed for tincture of cinchona.) Stomachic and tonic, with mild laxative properties. Dose, fʒj. to fʒij.

Vinum Gentianæ compositum, E. (Gentian, in coarse powder, ℥ss.; yellow bark, in coarse powder, ℥j.; bitter orange-peel, dried, and sliced, ʒij.; canella, in coarse powder, ʒj.; proof spirit, f℥ivss.; sherry, f℥xxxvj.; digest the root and bark for 24 hours in the spirit; add the wine and digest for seven days more; strain and express the residue strongly, and filter the liquors.) An excellent stomachic and tonic; Dose, f℥ss. to f℥j.

Extractum Gentianæ, D. L. E. ("Take of Gentian root, in thin slices, ℔j.; distilled water, Oiij.; macerate the gentian in one pint and a half of the water for six hours, then strain and express. Add to the residue the remaining pint and a half of water, macerate again for six hours, strain and express. Finally, mix the liquors and evaporate by a steam or water bath to a proper consistence," D. "Gentian, sliced, ℔iij.; boiling distilled water, Ovj.; macerate for 12 hours in four pints of the water, pour off the liquor and strain; add the other two pints of water to the residue, macerate for six hours, press out the solution gently and strain; finally evaporate the mixed liquors to a proper consistence," L. "Gentian, any convenient quantity; bruise it to a moderately fine powder; mix it thoroughly with half its weight of distilled water; in 12 hours put it into a percolator, and exhaust it by percolation with temperate distilled water. Concentrate the liquid; filter it before it becomes too thick, and evaporate in the vapour bath to the due consistence," E.) An excellent tonic extract; Dose, gr. x. to ʒss. two or three times a day, in the form of pill; in this state it may be prescribed with the preparations of iron.

INCOMPATIBLES.—Solution of subacetate of lead; nitrate of silver; sulphate of iron; and analogous salts.

MENYANTHES, E.—*The common Buckbean. Leaves of Menyanthes trifoliata.* An indigenous plant, growing plentifully in marshy places; belonging to the Natural family *Gentianaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Roots, densely creeping and matted; Leaves, ternate, stalked; Leaflets obovate, obscurely toothed; Flowerstalk, simple, from 5 to 8 inches high, bearing a compound raceme of many white flowers, tipped externally with red, and beautifully fringed with white filaments within.

The whole of this plant possesses a bitter taste, which it retains when dried; it contains bitter extractive, green colouring matter, albumen, starch, and a trace of tannic acid. Buckbean is a tonic of some power and may be employed as an indigenous substitute for gentian; it is so rarely used, however, that it has been omitted from the last edition of the London Pharmacopœia. The dose of the dried leaves in powder is from gr. x. to ʒss.; or of an infusion (prepared with ℥j. of the dried leaves, and Oj. of boiling water,) f℥j. to f℥ij. An extract may be prepared in the same manner as extract of gentian, the dose of it would be from gr. x. to gr. xx.

INCOMPATIBLES.—The sesqui-salts of iron; nitrate of silver; and acetate of lead.

MYRRHA, D. L. E.—*Myrrh. Gum-resinous exudation of Balsamodendron myrrha*, D, L. *Gummy resinous exudation of Balsamodendron (Protium ?) myrrha*, E. A native of Gison on the borders of Arabia Felix and of Southern Abyssinia; belonging to the Natural family *Amyridaceæ*, and to the Linnæan class and order *Octandria Monogynia*.

BOTANICAL CHARACTERS.—An arborescent shrub, with a pale ash-gray bark, and spinescent branches; Leaves, ternate, on short footstalks; Flowers, unknown; Fruit, somewhat larger than a pea, ovate, acuminate, brown.

PREPARATION.—Myrrh exudes from the tree like cherry-tree gum, issuing from natural fissures in the bark and from bruises made with stones; it is at first of the consistence of oil, but soon becomes hard and dark coloured. It is imported into Britain by way of the East Indies.

PHYSICAL PROPERTIES.—Myrrh, like the other gums, is met with in commerce of different qualities. The finest, *Turkey Myrrh*, (so called because it was formerly imported by way of Turkey, is in irregular shaped tears or masses, varying in size from that of a pea to that of a chesnut, but pieces are often met with more than twice that size ; they are semi-transparent, of a reddish-yellow or reddish-brown colour, the larger pieces being the darker coloured ; their fracture is shining, somewhat fatty, presenting often small white striæ in the centre, particularly of the largest masses. The taste of myrrh is acrid and bitter, the odour agreeable and aromatic; the finer pieces of Turkey myrrh are often selected and sold under the name of picked myrrh. The inferior sorts, *East India Myrrh*, are on an average in much smaller tears than Turkey myrrh ; some of the tears are almost transparent and of a very pale colour, others are dark brown ; they are generally mixed with other gums.

CHEMICAL PROPERTIES.—Myrrh has been carefully analysed by Ruickoldt. Its specific gravity varies from 1·120 to 1·180. It is composed of 2·183 per cent. of volatile oil (*Myrrhol,*) 44·760 of resin (*Myrrhin,*) 40·818 of gum (*Arabin,*) carbonates of lime and magnesia, and a trace of gypsum and oxide of iron. Its medical properties depend on the volatile oil and the resin, both of which are dissolved out completely by rectified spirit, partially by proof spirit, and very slightly by water ; the latter menstruum dissolves all the soluble gum, and forms with it a thicker mucilage than with gum acacia. By heat myrrh is softened, but does not melt ; it is inflammable.

ADULTERATIONS.—Myrrh is frequently adulterated with the inferior sorts, and with other gum resins. The finer pieces of Turkey myrrh should be alone employed in medicine. Righini has proposed the following method for ascertaining the purity of myrrh :—" Reduce to very fine powder 4 parts each of myrrh and of muriate of ammonia, and triturate them together for about a quarter of an hour ; then add gradually and with constant agitation, from 60 to 100 parts of water." If the myrrh be pure and does not contain any foreign bodies, the mixture dissolves readily.

THERAPEUTICAL EFFECTS.—Myrrh is a stimulating aromatic tonic, and is consequently inadmissible in cases where there is any tendency to inflammatory action. It is principally used in debilitated states of the digestive organs, or in diseases attended with excessive secretion from the mucous membranes. Myrrh is an excellent addition to alteratives and astringents in the protracted diarrhœas of infancy and childhood. It was formerly in high esteem as an emmenagogue, but has completely lost its repute as such.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx. in powder or made into an emulsion with water.

Decoctum Myrrhæ, D. (Take of myrrh, ʒij. ; water, f℥viiiss. Triturate the myrrh with the water gradually added, then boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces.) Dose, f℥ss. to f℥j.

Tinctura Myrrhæ, D. L. E. (" Myrrh, in coarse powder, ℥iv.; rectified spirit, Oij. ; macerate for fourteen days, strain, express, and filter," D. " Myrrh, powdered, ℥iij.; rectified spirit, Oij.; macerate for seven days and filter," L. " Myrrh, in moderately fine powder, ℥iiiss.; rectified spirit, Oij.; pack the myrrh very gently without pressure in a percolator; then pour on the spirit; and when two pints have passed through, agitate well to dissolve the oleo-resinous matter which first passes, and which lies at the bottom. This tincture is much less conveniently prepared by the process of digestion for 7 days," E.) The dose of this tincture for internal use is from fʒj. to fʒij. It is most generally employed diluted with water as a lotion in sponginess or ulceration of the gums; it is also used as a stimulant application to foul ulcers. When mixed with water, in consequence of the precipitation of the resin, a milky solution is formed.

QUASSIA, D. L. E.—*Quassia. The wood of Picræna excelsa,* D. L. *Wood chiefly of Picræna excelsa, and seldom of Quassia amara,* E. The *Quassia* or *Picræna excelsa* is a native of Jamaica; belonging to the Natural family *Simarubaceæ,* and to the Linnæan class and order *Decandria Monogynia.* The *Quassia amara* or true quassia tree yields none of the quassia at present met with in British commerce; it is a native of the Continent of South America and of many of the West Indian Islands.

BOTANICAL CHARACTERS.—*Picræna excelsa* is a tall handsome tree, often attaining a height of 100 feet; Leaves, pinnated, ; Flowers small, yellowish-green, in axillary, very compound racemes.

PHYSICAL PROPERTIES.—Quassia wood is imported in billets from two to nine inches in diameter, covered with a brittle, reticulated, dark-brown bark. The wood is close, but light, of a pale yellow colour, odourless, with an intensely bitter taste. The billets are cut into chips for medical use.

CHEMICAL PROPERTIES.—It is composed of lignin, gummy matter, some salts of lime, a minute trace of volatile oil, and a peculiar neutral bitter principle which has been named *quassin* or *quassite.* It yields its bitterness to boiling water and to alcohol.

ADULTERATIONS.—Quassia wood being scarce, other woods which resemble it in appearance are frequently substituted for it. They may be at once detected by their wanting the pure bitter taste of quassia; the infusion also of most of the spurious quassias is coloured blackish by the sesqui-salts of iron, but no effect is produced on the infusion of the true wood.

THERAPEUTICAL EFFECTS.—Quassia is amongst the most powerful of the pure bitters, and consequently is essentially tonic; according to some it possesses narcotic properties also, and it undoubtedly acts as a narcotic poison on insects and some of the lower animals. In medicine it is chiefly used in dyspepsia resulting from atony of the digestive organs, and it is found particularly useful in that form which results from dissipation. The infusion forms an excellent vehicle for alkaline remedies in the acidity of the stomach of gouty and rheumatic habits, and for saline purgatives in the constipation of atonic dyspepsia. Owing to its intense bitterness, quassia is also a good anthelmintic.

DOSE AND MODE OF ADMINISTRATION.—In consequence of the difficulty of reducing it to powder, quassia is not given in substance; the dose of it would be from gr. xv. to gr. xxx.

Infusum Quassiæ, D. L. E. ("Take of quassia wood, rasped, ʒj. boiling water, f℥viiiss. Infuse for one hour in a covered vessel, and strain. The product should measure about eight ounces," D. "Quassia, sliced, ʒij. ; boiling distilled water, Oj. ; infuse for two hours in a covered vessel and strain," L. "Quassia, in chips, ʒj. ; boiling water, Oj. ; infuse for two hours in a covered vessel, and then strain through linen or calico," E.) Dose, f℥j. to f℥ij. If given in too large doses it is apt to occasion vomiting. The chalybeate preparations do not alter the colour of infusion of quassia, it may be therefore employed as a vehicle for their administration. The Dublin infusion is too strong.

Tinctura Quassiæ, E. (Quassia chips, ʒx. ; proof spirit, Oij. ; macerate for seven days and strain.) Dose, fʒj. to fʒij.

Tinctura Quassiæ composita, E. (Cardamom seeds, bruised; and cochineal, bruised, of each, ʒss. ; cinnamon, in moderately fine powder; and quassia chips, of each, ʒvj.; raisins, ℥vij. ; proof spirit, Oij. ; digest for 7 days, strain the liquor, express strongly the residuum and filter. This tincture may be also made by percolation, as directed for compound tincture of cardamom, provided the quassia be rasped or in powder.) An aromatic and bitter tonic. Dose, fʒj. to f℥ss.

Extractum Quassiæ, E. (To be prepared from quassia in the same way with extract of liquorice root.) Dose, gr. v. to gr. xv. in pill.

INCOMPATIBLES.—*With the infusion.* Nitrate of silver; and the acetates of lead.

SALIX, E.—*Willow-bark. Bark of Salix caprea.* The genus salix is placed in the Natural family *Salicaceæ,* and in the Linnæan class and order *Diœcia Diandria.* There are no less than 64 species of Salix indigenous to the British islands; any of the species which possess a bitter tasting bark may be used in medicine.

BOTANICAL CHARACTERS.—Shrubs or trees. *Barren flowers*; scales of the catkin, single flowered, imbricated, with a nectariferous gland; Perianth, none; Stamens, 1–5. *Fertile flowers*; Scales of the catkin, single-flowered, imbricated, with a nectariferous gland; Perianth, none; Stigmas, 2, often cleft; Capsule, 1-celled, 2-valved, many-seeded; Seeds, comose. HOOKER.

PHYSICAL PROPERTIES.—Dried willow-bark is met with in partially quilled pieces of from 6 to 8 inches in length; the epidermis is smooth and of a silver-gray colour. It is odourless, but has a very bitter, somewhat astringent taste.

CHEMICAL PROPERTIES.—Willow-bark yields its properties to boiling water and to alcohol. Its constituents are tannin, resinous extractive, gummy matter, chlorophyll, yellow colouring matter, an organic salt of magnesia, and a peculiar principle named *Salicin*, on which the febrifuge and tonic properties of the bark depend. The best process for preparing *Salicin* is that of Erdmann; it is as follows:—"Take of the bark of Salix pentandra (or of any other of the species, the bark of which tastes bitter,) ℔j.; macerate for 24 hours in milk of lime consisting of ℥ij. of recently burned lime in Oviij. of water; then boil for half an hour. Pour off the liquor and repeat the process twice with the residuum. Mix all the decoctions; allow the mixture to settle, and pour off the clear liquor, concentrate to Oij.; digest with ℥viij. of animal charcoal, filter and evaporate to dryness. Exhaust with spirit containing 28 per cent. of alcohol, distil off the spirit, and purify the crystals which form, by boiling with animal charcoal and recrystallizing. Thus treated, ℔j. of bark yields ʒv. of salicin." Salicin crystallizes in delicate, colourless, silky needless, which have an intensely bitter taste, but no odour; they are neutral. It is permanent in the air, is not altered at a temperature of 212°, fuses at 248°, and is decomposed at a higher temperature. It is soluble in eighteen parts of cold, and in one of boiling water; is very soluble in alcohol, but insoluble in ether and oil of turpentine. Its composition in the crystalline state is $C^{26}H^{18}O^{14}$, (PIRIA.) The presence of salicin in large quantity in willow-bark is indicated by sulphuric acid reddening a strong decoction.

THERAPEUTICAL EFFECTS.—Willow-bark is an excellent tonic and has been used successfully as a febrifuge. It may be employed in the same cases as cinchona bark, for which it forms an admirable indigenous substitute. Salicin resembles in its properties disulphate of quina, over which it possesses the advantage of not being so liable to irritate the stomach. I have used it very extensively as a tonic in the debility following acute diseases, particularly in cases accompanied by irritability of the digestive organs, and consider its powers to be fully equal to those of disulphate of quina.

DOSE AND MODE OF ADMINISTRATION.—Of the powdered bark, ʒss. to ʒj.

Salicin. Dose, as a tonic, gr. ij. three or four times a day; as a febrifuge, ℈j to ℈ij. in divided doses during the intermission. It may be given in powder combined with sugar or some aromatic powder; or dissolved in water sweetened with some agreeable syrup, as syrup of orange-peel or syrup of *Hemidesmus indicus.*

INCOMPATIBLES.—Ammonia and its carbonates; lime water; carbonate of potash; the sesqui-salts of iron; acetate of lead; corrosive sublimate; and sulphate of zinc.

SIMARUBA, E. SIMARUBA AMARA, CORTEX RADICIS, D.—*Simaruba. Bark of the root of Simaruba amara.* This tree is a native of Jamaica and Guiana, and belongs to the Natural family *Simarubaceæ*, and to the Linnæan class and order *Decandria Monogynia.*

BOTANICAL CHARACTERS.—A tall tree, with long creeping roots; Leaves, alternate, pinnate; Flowers, small, whitish, diœcious, in panicles; Fruit, 5, ovate, smooth, black capsules, placed on a fleshy disk.

PHYSICAL PROPERTIES.—The bark of the root is alone officinal; it is imported from Jamaica, and is in long pieces folded flat, covered with a reddish-yellow epidermis, wrinkled and warty: the inner surface of the bark is yellowish-brown. It has a bitter, persistent taste, but no odour.

CHEMICAL PROPERTIES.—Simaruba bark contains a trace of volatile oil, resinous matter, *ulmin* (a bitter principle analagous to *quassin*,) lignin, and some salts. It yields its properties readily to water and to alcohol.

THERAPEUTICAL EFFECTS.—Simaruba is a bitter tonic, not much prescribed in the present day, and has been therefore omitted from the last edition of the London Pharmacopœia: in large doses it produces vomiting and purging. It has been highly praised for its remediate powers in chronic diarrhœa and dysentery, by many practitioners both on the continent and in this country. As a bitter tonic it is, however, much inferior to many remedies of this class.

DOSE AND MODE OF ADMINISTRATION.—It is not given in powder; the following is its only officinal preparation.

Infusum Simarubæ, D. E. ("Take of Simaruba root-bark, bruised, ʒij.; boiling water, f℥ix.: infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces," D. "Simaruba, bruised, ʒiij.; boiling water, Oj.; infuse for two hours, in a covered vessel, and then strain through linen or calico," E.) Dose, f℥j. to f℥ij.

INCOMPATIBLES.—Lime water; alkaline carbonates; the salts of lead, mercury, and silver; and astringent vegetable infusions or decoctions.

SODÆ ARSENIAS. *Arseniate of Soda.* This salt is not officinal in any of the British pharmacopœias.

PREPARATION.—Take of nitrate of soda, 100 parts; arsenious acid, 116 parts; crystallized carbonate of soda, 168 parts; mix the nitrate of soda and the arsenious acid pulverised; introduce them into a Hessian crucible and heat to redness; when cold break the crucible and dissolve the salt in water; then add the carbonate of soda in powder until the solution which was at first acid becomes neutral or even restores the blue colour to reddened litmus paper. Finally, filter, evaporate, and crystallize.

PROPERTIES.—This salt crystallizes in beautiful regular hexahedral prisms, transparent and colourless; odourless, with a strongly acrid taste. It is very soluble in water. Its composition is $\mathrm{Na, As\,O^5 + 12\,HO}$.

THERAPEUTICAL PROPERTIES.—This preparation, though perhaps the most generally used salt of arsenic on the continent, has not been much employed in this country. My experience leads me to place much reliance on it, especially in cases in which the arsenite of potash disagrees with the stomach ; it is used in the same diseases as that preparation (see page 477.)

DOSE AND MODE OF ADMINISTRATION.—It may be given in pill in doses of from 1-12th to 1-8th of a grain ; but it is more safely administered in solution ; one of the following strength under the name of *Pearson's Solution* is in very general use in France :—Arseniate of soda, in crystals, gr. j. ; distilled water, fʒx. ; dissolve. Dose, min. xxx. very gradually increased to fʒij. three times daily.

TARAXACUM, L. E. TARAXACUM DENS-LEONIS, RADIX, D.—*Dandelion. The root* (*Fresh root*, L.) *of Taraxacum dens-leonis.* Indigenous ; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Æqualis.*

BOTANICAL CHARACTERS.—Root, perennial, spindle-shaped ; Leaves, all radical, runcinate, glabrous, toothed ; Scape, with a single, large, yellow flower.

PHYSICAL PROPERTIES.—The whole of the dandelion plant abounds in a milky juice, which is most abundant in the months of August and September, at which season it should be gathered for medical use. The juice has a bitter taste but no odour.

CHEMICAL PROPERTIES.—Dandelion juice contains mannite, resin, sugar, gum, caoutchouc, various salts, and a peculiar bitter extractive, which has been obtained by M. Polex in a crystalline state and named by him *Taraxacine ;* the latter is probably the active principle of the plant. Dandelion root and herb yield their properties to boiling water.

ADULTERATIONS.—Herb collectors often substitute various other roots for dandelion ; the best way for the druggist to prevent the substitution is to require that some of the leaves be attached to the roots, as they are highly characteristic.

THERAPEUTICAL EFFECTS.—Dandelion is a useful tonic in chronic diseases of the liver, and in other affections accompanied by derangement of the biliary organs, as in some forms of dyspepsia and of cutaneous disease. It is also held by many to be diuretic and aperient, but these effects are not produced unless it be given in very large doses.

DOSE AND MODE OF ADMINISTRATION.—Only as follows :—

Decoctum Taraxaci, L. E. (" Taraxacum, bruised, ℥iv. ; distilled water, Oiss. ; boil down to a pint and strain," L. " Taraxacum herb and root, fresh, ℥vij. ; water, Oij. ; boil down to Oj. ; squeeze and strain," E.) Dose, f℥j. to f℥ij.

Extractum Taraxaci, L. E. ("To be prepared in the same manner as extract of liquorice," L. "Fresh dandelion root, ℔j.; boiling water, cong. j.; proceed as for extract of poppy heads," E.) When properly prepared this extract is of a fine brown colour, and has a bitter, not *sweet,* taste. Dose, gr. x. to ʒss.

Liquor Taraxaci, (Fresh dandelion roots, cleaned dried and sliced, ℥xij.; infuse for 24 hours in a sufficient quantity of distilled water to cover them. Press and set aside that the fecula may subside; decant and heat the clear liquor to 180° F.; filter the liquid whilst hot, and evaporate spontaneously until the product measures f℥xij., to this add f℥iv. of rectified spirit.) When properly prepared, this liquid resembles in colour pale sherry; it is the best preparation of dandelion. The dose of it is from min. x. to min. xl.

INCOMPATIBLES.—Acetate of lead; the sesqui-salts of iron; corrosive sublimate; nitrate of silver; and infusion of galls.

ULMUS, L.—*Elm-bark. The inner bark of Ulmus campestris.* Indigenous; belonging to the Natural family *Cupuliferæ (Ulmaceæ,* Lindley,) and to the Linnæan class and order *Pentandria Digynia.*

BOTANICAL CHARACTERS.—A large tree, with rugged bark; Leaves, rhomboid-ovate, acuminate, wedge-shaped, and oblique at the base; Flowers, in dense heads, each subtended by a small scale.

PROPERTIES.—The inner bark alone of the elm should be used in medicine; it is of a whitish colour, inodorous, with a bitter, somewhat astringent taste. It contains resin, gum, tannin, mucous-extractive and some salts. Its active principles are extracted by boiling water.

THERAPEUTICAL EFFECTS.—Elm bark, though at present but little employed in medicine, is a most useful tonic; the decoction and syrup if taken in large quantity determine to the skin, and consequently are of much service in the treatment of cutaneous affections especially when occurring in debilitated habits; in such cases I am in the habit of employing them very extensively and with much benefit.

DOSE AND MODE OF ADMINISTRATION.—Used only in the form of decoction and syrup.

Decoctum Ulmi, L. (Elm bark, bruised, ℥iiss.; distilled water, Oij.; boil down to Oj., and strain.) Dose, f℥iv. to f℥vj. three or four times a day. The fresh inner bark should be always used in preparing this decoction.

Syrupus Ulmi. (Fresh elm bark, ℥iv.; water, Oij.; boil down to Oiss., strain, and with the aid of steam or water-heat, dissolve in it ℔iv. of sugar.) Dose, fʒij. to f℥ss. An excellent addition to mixtures in the treatment of diseases of the skin.

INCOMPATIBLES.—Sulphate of iron; acetate of lead; nitrate of silver; and gelatin.

ZINCI OXYDUM.—*Oxide of zinc* (described in the division *Astringents,*) is employed internally as a tonic in some forms of convulsive and spasmodic diseases, particularly epilepsy, in which it proves in many instances highly beneficial, but its use must be persevered in for a considerable period. It may be given in powder or in pill, in doses of gr. j. or gr. ij. gradually increased to gr. x. twice daily. M. Herpin, in a recently published essay on epilepsy, lauds in the highest terms the efficacy of the oxide of zinc in the treatment of this disease ; out of forty-two cases in which he administered it, twenty-eight, he states, were cured. He commenced it with adults in doses of from six to eight grains daily, given in divided quantities one hour after each meal ; the dose was augmented every week by two grains daily, until forty-five grains were taken during the day, and it was then continued in this quantity for three months. I do not, however, think there is any advantage to be derived from giving oxide of zinc in such enormous quantities, as in my own practice I have found it more successful than any other remedy in the treatment of epilepsy when administered in the doses first stated above, provided only its use be long enough continued.

ZINCI SULPHAS.—*Sulphate of zinc* (described in the division *Astringents,)* has been also administered as a tonic in spasmodic diseases, but its utility in their treatment is very doubtful.

CHAPTER XXI.

SUPPLEMENTARY AGENTS.

IN this chapter are included the different articles which, though not employed in medicine for their remediate powers, are contained in the Pharmacopœias, being used as *Colouring agents, Perfumes, Tests,* and *Pharmaceutical agents.*

ALCOHOL AMYLICUM, D.—*Fusel oil.* This oily fluid has been referred to at page 46 ; it has been introduced into the last edition of the Dublin Pharmacopœia, as valerianic acid is directed to be prepared from it.

PREPARATION.—Take of the light liquid which may be obtained at any large distillery by continuing the distillation for some time after the pure spirit has been all drawn off, any convenient quantity. Introduce it into a small still or retort connected with a condenser, and apply heat, so as to cause distillation. As soon as the oil begins to come over unmixed with water, the receiver should be changed, and the distillation being resumed and carried nearly to dryness, the desired product will be obtained, The liquid drawn over during the first part of the distillation will consist of an aqueous fluid, surmounted by a stratum of the fusel oil. This latter, though impregnated with a minute quantity of water, should be separated and preserved, as being sufficiently pure for use.

ACIDUM HYDROSULPHURICUM, *(recens præparatum)*, L.—*Freshly prepared Hydrosulphuric acid.* Employed as a test.

AMMONIÆ OXALAS, L. E.—*Oxalate of Ammonia in crystals,* L. *Oxalate of Ammonia,* E.

PREPARATION.—"Oxalic acid, ℥iv. ; carbonate of ammonia, ℥viij. ; distilled water, Oiv. ; dissolve the carbonate in the water, add gradually the acid, boil, and concentrate sufficiently for crystals to form on cooling," E. No formula for its preparation is given in the London Pharmacopœia.

This salt is not used in medicine. It was introduced into the last editions of the London and Edinburgh Pharmacopœias, as a test for lime and its salts, with which it forms a white precipitate, soluble in nitric acid, but only sparingly soluble in hydrochloric acid.

AQUA DESTILLATA, D. L. E.—*Distilled Water.*
AQUA FONTANA, D.—*Spring Water.*

PREPARATION.—*Aqua destillata.*—An article of the Materia Medica in the last edition of the London Pharmacopœia. "Take of spring, or river water, any convenient quantity. Having introduced it into a copper still connected with a block-tin worm, or a Liebig's condenser, draw over about one-fortieth by distillation; this being rejected, continue the process until only about one-fifth of the original volume of the water remains in the still. Let the distilled water be preserved in well-stopped bottles," D. "Take any convenient quantity of spring water, distil it from a proper vessel, rejecting the first twentieth, and preserving the first half of the remainder," E.

Spring and river water contain foreign matters, which render them unfit for many pharmaceutical purposes, and as vehicles for several medicines; the above processes for their purification are therefore directed. In the London and Edinburgh Pharmacopœias the following tests for the purity of distilled water are given:—"Lime water, chloride of barium, nitrate of silver, oxalate of ammonia, or hydrosulphuric acid being added, it remains limpid," L. "Free of colour and odour, unaltered by sulphuretted hydrogen or nitrate of silver, nitrate of baryta or oxalate of ammonia," E.

ARGENTI AMMONIATI SOLUTIO, E.—*Solution of Ammoniaco-nitrate of Silver.*

PREPARATION.—"Nitrate of silver, gr. xliv.; distilled water, f℥j.; aqua ammoniæ, a sufficiency; dissolve the salt in the water, and add the aqua ammoniæ gradually, and towards the end cautiously, till the precipitate at first thrown down is nearly, but not entirely, redissolved."

This solution is employed as a very delicate test for arsenious acid, (see page 163.)

ARGENTI NITRAS *(crystalli)*, L.—Nitrate of Silver, in crystals. Used for the preparation of the solution (see page 475), chiefly employed for testing. No formula for their preparation is given in the London Pharmacopœia.

ARGENTUM PURIFICATUM, D. ARGENTUM, L. E.—*Refined Silver. Silver. Metallic Silver.*

Silver is employed in pharmacy for preparing the nitrate. As met with in the shops, it usually contains traces of gold, copper, and lead; its freedom from which being desirable for the above purpose, the following tests for its purity are given:—"Entirely soluble in diluted nitric acid; this solution treated with an excess of solution of muriate of soda, gives a white precipitate entirely soluble in aqua ammoniæ, and a fluid which is not affected by sulphuretted hydrogen (Specific gravity, 10·4, L.)," L. E.

AURANTII OLEUM, E.—*Oil of Orange. Oil of Neroli. Volatile oil of the flowers of Citrus vulgaris, and sometimes of Citrus aurantium,* E.

AURANTII AQUA, L. E.—*Orange flower-water. Distilled water of flowers of Citrus bigaradia and Citrus aurantium,* L. *Distilled water of the flowers of Citrus vulgaris, and sometimes of Citrus aurantium,* E.

The *Citrus aurantium* has been described in the division *Refrigerants,* and the *Citrus vulgaris,* in the division *Tonics.* Orange flowers have a very agreeable odour, which depends on volatile oil; it is completely dissipated by drying. The volatile oil may be procured by distillation with water; it is imported into Britain from France and the south of Europe. It has been introduced into the Edinburgh Pharmacopœia on account of its agreeable odour, and as an agent for the extemporaneous preparation of orange-flower water.

Orange-flower water is an article of the Materia Medica in the London and Edinburgh Pharmacopœias, being usually imported. It is only employed on account of its fragrant odour as a vehicle for other medicines. As imported it is often impure and frequently contains traces of lead or copper; its purity may be known by "its not being coloured by hydrosulphuric acid," L.; "its being nearly colourless and unaffected by sulphuretted hydrogen gas," E. A most agreeable syrup, *Syrupus Florum Aurantii,* may be prepared by dissolving a sufficiency of sugar in it without heat.

BARYTÆ CARBONAS, D. E.—*Carbonate of Baryta.*—This substance, is found native in many parts of England, and is known to mineralogists by the name of *Witherite.* It is introduced into the pharmacopœias as being employed for the preparation of chloride of barium. It acts as a narcotico-acrid poison on animals and on man.

BARYTÆ NITRAS, E.—*Nitrate of Baryta.*

PREPARATION.—BARYTÆ NITRAS, E. "To be prepared like the muriate of baryta, substituting pure nitric for muriatic acid."—SOLUTIO BARYTÆ NITRATIS, E. "Nirate of baryta, 40 grains; distilled water, 800 grains; dissolve the salt in the water, and keep the solution in well-closed bottles."

This salt is not used in medicine; it is directed to be employed by the Edinburgh College as a test, and the above formulæ are given for its preparation and for a solution of a certain strength.

BARYTÆ SULPHAS, D. E.—*Sulphate of Baryta. Heavy Spar.* Not employed in medicine; used in pharmacy for the preparation of chloride of barium.

BERGAMOTÆ OLEUM, E.—*Oil of Bergamot. Volatile oil of the rind of the fruit of Citrus limetta*, E. The bergamot citrus is cultivated in the South of Europe, and belongs to the Natural family *Aurantiaceæ*, and to the Linnæan class and order *Polyadelphia Polyandria*.

Oil of bergamot exists in the rind of the fruit, from which it is obtained either by expression or distillation; it is imported from the South of Europe. The oil is of a pale greenish-yellow colour, has a peculiar fragrant odour, and a warm pungent taste. Its specific gravity is 0·862. It is only employed in medicine as a perfume, chiefly to give an agreeable odour to ointments.

BISMUTHUM, D. L. E.—*Bismuth. Metallic Bismuth.*

This metal is only employed in pharmacy for preparing the trisnitrate. As met with in the shops it frequently contains traces of copper or iron; its freedom from which being requisite for the above purpose, the following tests for ascertaining its purity are given by the London and Edinburgh Colleges:—"Its specific gravity is 9·8," L. "Entirely soluble in nitric acid with the aid of heat; and the solution is colourless or nearly so, and deposits a white powder when much diluted with cold water," E.

CALCIS PHOSPHAS PRÆCIPITATUM, D.—*Precipitated phosphate of Lime. Bone-phosphate of Lime. Sub-phosphate of Lime.*

PREPARATION.—Take of ox-bones, burned to whiteness in a clear fire, ℥iv.; pure muriatic acid, f℥vj.; distilled water, Oij.; solution of ammonia, f℥xj., or as much as may be sufficient. Reduce the calcined bones to a fine powder, and digest upon this the acid, diluted with a pint of the water, until it is dissolved. To the solution, first cleared (if necessary) by filtration, add the remainder of the water, and then the solution of ammonia, until the mixture acquires an alkaline reaction, and having collected the precipitate upon a calico filter, let it be washed with boiling distilled water as long as the liquor which passes through gives rise to a precipitate, when permitted to drop into a solution of nitrate of silver acidulated with nitric acid. The washed product should now be dried by exposing it for some days on porous bricks to a warm atmosphere.

Bone-phosphate of lime is composed of 8 equivalents of lime, and 3 of phosphoric acid, ($8\ CaO + 3\ PO^5$). It was formerly employed in medicine in rickets and mollities ossium, on the supposition of its affording bone-earth to the osseous system; but the fallacy of such a doctrine is well understood now, and at present it is only used in pharmacy for preparing phosphorus and the phosphate of soda.

CALX RECENS USTA, D. CALX, L. E.—*Quick-lime. Fresh burnt Lime.*

PREPARATION.—An article of the Materia Medica in the Dublin and London Pharmacopœias. "Heat white marble, broken into fragments, in a covered crucible at a full red heat for three hours, or till the residuum, when slaked and suspended in water, no longer effervesces on the addition of muriatic acid," E.

Quick-lime is used for making the officinal preparations. Its purity is known by its dissolving entirely and without effervescence in hydrochloric acid; the solution not precipitating with ammonia.

CARBO ANIMALIS, D. L. E.—*Animal-charcoal. Ivory-black*, D. *Charcoal prepared by fire from bullock's blood*, L. *Impure animal charcoal, obtained commonly from bones; Ivory-black*, E.

Animal charcoal is usually prepared by calcining the bones of animals in close vessels; thus obtained, it contains phosphate and carbonate of lime, which would unfit it for the purposes to which it is applied in pharmacy, namely, that of acting as a decolorizing agent in the preparation of the vegetable alkaloids; processes are consequently given in the Dublin and Edinburgh Pharmacopœias for purifying the commercial article.

PREPARATION.—CARBO ANIMALIS PURIFICATUS, D. E.—"Take of ivory black, ℔v.; muriatic acid of commerce, Oiij.; water, Cong. iij. Oiij.; distilled water, as much as is necessary. To the acid, diluted with three pints of water, gradually add the ivory black, and digest, with repeated stirring, at a gentle heat for twenty-four hours. Pour on now a gallon of water, and when, after the mixture has been well agitated, the insoluble matters have subsided, remove the clear solution by decantation or the syphon. Let this be done a second and third time. Place now the black sediment on a calico filter, and wash it with distilled water, until the washings cease to give a precipitate with nitrate of silver. Finally, let the product be dried in a stove or oven, a gentle heat being at first applied, which must be finally raised to between 300° and 400°," D. "Ivory-black, ℔j.; commercial muriatic acid, and water, of each, f℥xij.; mix the acid and water, add gradually the ivory-black, stirring occasionally. Digest with a gentle heat for two days, agitating from time to time; then boil, dilute with two pints of water, collect the undissolved charcoal on a filter of linen or calico, and wash it with water till what passes through scarcely precipitates with solution of carbonate of soda. Heat the charcoal first moderately and then to redness in a closely covered crucible," E.

After animal charcoal has been employed as a decolorizing agent, it loses its powers as such; which, however, may be again restored to it by drying and heating to redness. When properly prepared, "if it be incinerated with its own volume of red-oxide of mercury, it is dissipated, leaving only a scanty ash."—*Edinburgh Pharmacopœia.*

CARBO, L. CARBO LIGNI, D. E.—*Wood-charcoal. Charcoal prepared by fire from wood*, L.

Wood-charcoal is obtained by burning billets of wood, the access of air being prevented. It is an article of the Materia Medica in the three pharmacopœias, being prepared on the large scale for various uses in the arts, particularly for the manufacture of gunpowder. In medicine it is at present rarely used except to destroy fetor; for which purpose it is applied in the form of powder or poultice to gangrenous sores, phagedenic ulcers, &c.; it is also used as a dentifrice, for which it is very generally employed, as by its mechanical action it removes incrustations from the teeth, and by its antiseptic powers corrects fetor of the breath. Charcoal has been administered in the treatment of various diseases, but the only one in which it is ever had recourse to in this country is dysentery, and in it merely to correct the fetor of the evacuations, for which purpose it is given in doses of gr. xx. frequently repeated. More recently it has been used in Paris in large doses, four or five teaspoonfuls before and after meals, in the treatment of painful affections of the digestive organs; its effects are said to be most beneficial: for this purpose it is directed to be prepared from the wood of the poplar and to be very finely powdered.

Cataplasma Carbonis, L. (Boiling water, f℥x.; bread, ℥ij.; linseed meal, ℥x.; charcoal, powdered, ʒiij.; macerate the bread for a short time in the water near the fire, then add the linseed by degrees stirring constantly so as to form a soft cataplasm; mix with it two drachms of the carbon and sprinkle the remainder over its surface.) Used for the purposes above stated.

COCCUS, L. COCCI, E. COCCUS CACTI, D.—*Cochineal. The entire insect, Coccus cacti.* A native of Mexico; belonging to the class *Insecta*, order *Hemiptera*. The cochineal insect and the plant on which it feeds have been recently introduced into Algeria; and France is now to a great extent supplied with cochineal from that colony.

The cochineal insect feeds chiefly on the Nopal plant (*Opuntia cochinillifera*), large plantations of which are cultivated for its nourishment in Mexico. The insects are collected three times a year, killed by immersion in boiling water, and dried with stove-heat; the first gathering is the best, consisting entirely of impregnated females, when they are of the largest size, and afford more colouring matter. As met with in commerce, cochineal is in the form of small roundish grains (each grain being a separate insect); they are wrinkled, from one to two lines long, and of a silvery purplish colour. They are inodorous, but have a rather bitter taste. Cochineal consists of some peculiar fatty substance, and a brilliant purplish-red colouring matter which has been named *cochinillin*; and which is a principal constituent in the pigment technically known as *carmine*.

Cochineal was at one time supposed to possess anodyne properties, and was employed in medicine in the treatment of hooping-cough and neuralgia: as a remedy for the former disease, its use has been again resorted to latterly in many parts of the continent, particularly in Germany. The tincture has been introduced into the last edition of the Dublin Pharmacopœia.

Tinctura Cocci Cacti, D. (Take of cochineal, in fine powder two ounces; proof spirit, one pint. Macerate for fourteen days, strain, express, and filter.) It may be given internally in doses of from fʒss. to fʒij.

Syrupus Cocci, L. (Cochineal, bruised, ℈iv.; boiling distilled water, Oj.; sugar, ℔iij.; or a sufficiency; rectified spirit, f℥iiss. or a sufficiency: boil the cochineal in the water for a quarter of an hour in a close vessel constantly stirring; then strain and proceed as for syrup of Althæa.) Used as a colouring agent in mixtures.

CORNU, L. E.—*Hartshorn shavings. The Horns of Cervus elephas.*

Hartshorn shavings are introduced into the Materia Medica as being employed in the preparation of antimonial powder (see page 175); boiled with water, they form a jelly similar to that obtained from cow-heels, calves' feet, &c. Calcined hartshorn—CORNU USTUM, is contained in the Materia Medica list of the last edition of the London Pharmacopœia, being described as *Phosphate of lime prepared by fire from horns;* it is nearly similar in composition to the *bone-phosphate of lime,* and was used for the same purposes (see page 545.)

CUPRUM, L.—*Metallic Copper.* Employed in testing.

CURCUMA, E.—*Turmeric. Rhizome of Curcuma longa.* A native of the East Indies and of China; belonging to the Natural family *Zingiberaceæ,* and to the Linnæan class and order *Monandria Monogynia.*

Turmeric is in short, roundish, somewhat curved pieces, about the thickness of the little finger, reddish-yellow externally, reddish-brown within; it has a peculiar aromatic odour, and a warm bitter taste. The colouring principle of turmeric has been obtained in a separate state by treating the alcoholic extract with ether; it has been named *curcumin.* Turmeric possesses some aromatic properties in consequence of which, as well as its colour, it is an ingredient in *Curry-powder.* It is not employed as a medicine, but is generally used as a testing agent for alkalies, which change its yellow colour to a red-ish brown. For this purpose *Turmeric paper* is employed; it is prepared by soaking white *unsized* paper in a decoction (obtained by boiling ℥j. of coarsely powdered turmeric in f℥xij. of water, straining through a cloth and allowing the fluid to settle for a few minutes), and drying.

FERRI SULPHURETUM, D. E.—*Sulphuret of Iron.*

PREPARATION.—*Dublin.* "Take of rods of iron, of the size employed in the manufacture of nails, any convenient number: having raised them to a strong red or white heat, apply them in succession by their heated extremities to sticks of sulphur, operating so that the melted sulphuret as it is formed, may drop into a stone cistern filled with water, and be thus protected from oxidation. The water being poured off, let the product be separated from the sulphur with which it is mixed, and, when dried, let it be enclosed in a well-stopped bottle." *Edinburgh.*—"Iron filings, 3 parts; sublimed sulphur, 1 part; mix them thoroughly; heat the mixture in a covered crucible till it becomes red hot; remove the crucible from the fire and allow the action to go on without heat. A much purer sulphuret may be obtained by a process similar to that ordered by the Dublin College."

Sulphuret of iron is not used in medicine; it is employed in pharmacy, for the preparation of sulphuretted hydrogen gas.

ICTHYOCOLLA, L.—*Isinglass.* Used as a test for tannic acid, see page 60.

INDIGO SULPHATIS LIQUOR, L.—*Solution of Sulphate of Indigo.* Indigo has been described at page 449. This solution, which is used as a test, is prepared by mixing powdered indigo with sulphuric acid, treating the liquid mass which results with water, and straining the solution.

LACMUS, E.—*Litmus. A prepared colouring matter from Rocella tinctoria.* (*Also obtained from Rocella fusiformis,* Lindley.) Natives of the Mediterranean and Channel islands; belonging to the Natural family *Lichenaceæ* (*Lichenales,* Lindley), and to the Linnæan class and order *Cryptogamia Algæ.*

It is probable that these are not the only lichens employed in the preparation of litmus, but the plants used, as well as the exact process followed are kept secret by the manufacturers. Sir Robert Kane, who has bestowed much attention on the subject, states that the lichens employed are ground with water to form a uniform pulp, and sufficient water added to make the whole into a thick fluid: ammoniacal liquors are from time to time mixed with this, the whole being exposed to the air and frequently agitated; when it has acquired the requisite shade of blue, chalk and plaster of Paris are added to the liquor so as to form a consistent paste, which when cut into little cubical masses and dried, forms the litmus of commerce. It is not employed in medicine; in pharmacy it is used as a test for acids and alkalies, its colour being changed to red by the former, and the original blue tint again restored by the latter. *Litmus paper* is prepared in a similar manner to *Turmeric paper.* (See page 548.)

LYCOPODIUM.—*Vegetable brimstone. A powder contained in the spore cases of Lycopodium clavatum and Lycopodium selago.* These two species of club-moss belong to the Natural family *Lycopodiaceæ.*

Lycopodium is an extremely fine, very light powder, of a delicate yellow colour, inodorous and tasteless. It is exceedingly inflammable, burning like gunpowder, on which account it is used in the preparation of fireworks. It is commonly employed in France for rolling pills in, to facilitate their formation and to prevent them from adhering; and for this purpose it is far superior to liquorice powder or magnesia which are ordinarily used for the purpose in this country. Pills coated with lycopodium may be put into water without being injured.

MANGANESII PEROXYDUM, D. MANGANESII OXYDUM, E. MANGANESII BINOXYDUM, L.—*Black oxide of Manganese. Peroxide of Manganese.* Found native in some parts of England and Scotland; it is known to mineralogists under the name of *Pyrolusite.*

It is only used as a pharmaceutical agent, at least in this country, being employed in the preparation of oxygen, chlorine, and iodine.

MARMOR, D. E.—*White Marble.* Used in pharmacy for preparing quick lime, and for yielding carbonic acid gas, when added to hydrochloric acid.

OSSA, D.—*Bones of the Ox or Bos taurus.*

Bones are an article of the Materia Medica in the Dublin Pharmacopœia; they are employed in the preparation of animal charcoal, the *Calcis Phosphas Præcipitatum,* and the *Sodæ Phosphas* of the pharmacopœias.

PHOSPHORUS, L.—*Phosphorus.* As this elementary substance is employed in the preparation of dilute phosphoric acid (see page 472) it is contained in the Materia Medica list of the London Pharmacopœia, in which it is characterised as :—"nearly free from colour; resembles wax; transparent; emits light in the dark. It ought to be kept in water, and excluded from access of light."

PLATINI BICHLORIDUM, L.—*Bichloride of Platinum.* This salt is obtained by dissolving metallic platinum in nitro-hydrochloric acid. An alcoholic solution of it is used as a test for the presence of potash, with which it produces a yellow precipitate.

PLUMBI NITRAS, D. E.—*Nitrate of Lead.*

PREPARATION.—*Dublin.*—"Take of litharge, in fine powder, ℥v.; pure nitric acid, f℥ij.; distilled water, Oiij.; dilute nitric acid, a sufficient quantity; to the litharge, placed in a porcelain dish, add the acid with a pint and a half of the water, and, applying a sand heat, and occasionally stirring the mixture, evaporate the whole to dryness. Upon the residue boil the remainder of the water, clear the solution by filtration, and, having acidulated it by the addition of a few drops of the dilute nitric acid, evaporate until a pellicle begins to form on the surface. The heat being now withdrawn, crystals will form on the cooling of the solution, which should be dried on blotting paper in a warm atmosphere, and preserved in a close bottle." *Edinburgh.*—" Litharge, ℥ivss.; dilute nitric acid, Oj.; Dissolve the litharge to saturation with the aid of a gentle heat; filter, and set the liquor aside to crystallize. Concentrate the residual liquor to obtain more crystals."

This salt is employed for the preparation of *Iodide of Lead;* and by the Edinburgh College as a test for ascertaining the purity of *Bitartrate of Potash,* (see page 128); it is not used in medicine.

PLUMBI OXYDUM RUBRUM, E.—*Red-oxide of Lead. Minium.*

Red lead is employed by the Edinburgh College for purifying the strong acetic acid (see page 155) and for preparing *Aqua Chlorinei.* It is not used in medicine.

POTASSÆ BICHROMAS, D.—*Bichromate of Potash.*

This salt is not used in medicine; it has been introduced into the last edition of the Dublin Pharmacopœia as being employed in the preparation of the *Valerianate of Soda.*

POTASSII ET HYDRARGYRI IODO-CYANIDUM, L.—*Iodo-cyanide of Mercury and Potassium.* Used only as a test, see page 329.

POTASSII FERROCYANIDUM, D. L. E.—*Ferrocyanide of Potassium, (in crystals,* L.) *Prussiate of Potash.*

This salt has been used by some physicians in America as a sedative, but the results obtained have been very uncertain, and it would appear to be rather an inert substance. It has been introduced into the pharmacopœias as being a cheap material for preparing hydrocyanic acid, (see page 328). The following characteristics and tests are given for it in the last edition of the London Pharmacopœia:—"Yellow; soluble in water; the solution is not changed on the addition of any alkali or of tincture of galls: what is thrown down by sulphate of iron is at first white, but afterwards becomes blue; the precipitate with sulphate of copper is brown, that with sulphate of zinc is white; at a gentle heat it is decolorised and 100 grains lose 12·6 of water; it is decomposed by a red heat; the residue is soluble in hydrochloric acid, from which it is again thrown down by ammonia; 100 grains yield 187 grains of sesquioxide of iron; finally if the salt be boiled with dilute sulphuric acid, it emits an odour of hydrocyanic acid."

PTEROCARPUS, L. E.—*Red-sandal wood. Wood of Pterocarpus santalinus.* A native of Ceylon; belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria.*

Red-sandal, or as it is often called, Red-saunders wood, is contained in the Pharmacopœias, being employed only as a colouring ingredient in the *Compound Spirit of Lavender.*

ROSA CENTIFOLIA, PETALA, D. L. E. *Petals* (*Fresh petals,* L.) *of Rosa centifolia.*

ROSÆ OLEUM, D. E.—*Attar or Otto of Roses. Volatile oil of the petals of Rosa centifolia.*

The hundred-leaved or cabbage rose, originally a native of Asia, is now cultivated freely in our gardens. It belongs to the Natural family *Rosaceæ,* and to the Linnæan class and order *Icosandria Polygynia.*

The pharmaceutical preparations of this rose are employed in medicine as perfumes, for giving an agreeable odour to mixtures, &c.; the volatile oil introduced into the last edition of the Dublin and Edinburgh Pharmacopœias is too expensive an article for general use. Laxative properties have been ascribed by some to the syrup, but they probably depend on the sugar which it contains.

PHARMACEUTICAL PREPARATIONS:—

Aqua Rosæ, D. L. E.—(" Take of essential oil of roses, min. xx.; distilled water, cong. ss. Mix with agitation, and filter through paper," D. " Rosa centifolia, ℔x.; water, cong. ij.; distil a gallon," L. " Petals of rosa centifolia, ℔x.; water, cong. ij.; rectified spirit, fʒiij.; mix and distil a gallon; the petals should be preferred when fresh, but it also answers well to use those which have been preserved by beating them with twice their weight of muriate of soda," E.) The formula of the Dublin College yields a milky product.

Syrupus Rosæ, L. *Syrupus Rosæ centifoliæ*, E. (" Rosa centifolia petals, ℥vij.; sugar, ℔vj.; boiling distilled water, Oiij.; rectified spirit, f℥vss.; macerate the petals in the water for twelve hours, and strain; evaporate the strained liquor in a water-bath to two pints, and dissolve the sugar in it; finally mix in the spirit," L. " Fresh damask-rose petals, ℔j.; boiling water, Oiij.; pure sugar, ℔iij.; infuse the petals in the water for twelve hours, strain the liquor, and dissolve the sugar in it with the aid of heat," E.) Syrup of roses is sometimes employed as a laxative for newly-born infants, in doses of fʒij. or fʒiij.

SAPO DURUS, D. E. SAPO, L.—*Hard Soap,* D. *Soap made with Olive Oil and Soda,* L. *Spanish or Castile Soap made with Olive Oil and Soda.*

SAPO MOLLIS, L. E. *Soft Soap. Soap made with Olive Oil and Potash.*

Soaps are used in pharmacy as the bases of some cerates and plasters, and for making pill masses. By some they are believed to be slightly laxative. The London College directs that " common soft soap made with fish-oil, tallow, and potash, should not be used."

SILEX CONTRITUS, L.—*Powdered Flint.* Used in the preparation of the distilled waters of the London Pharmacopœia.

SODÆ CAUSTICÆ LIQUOR, D. SODÆ LIQUOR, L.—*Solution of Caustic Soda.*

PREPARATION.—"Take of crystallized carbonate of soda of commerce, ℔ij.; fresh-burned lime, ℥x.; distilled water, cong. j. f℥vij. Slake the lime with seven ounces of the water. Dissolve the carbonate of soda in the remainder of the water, and having raised the solution to the boiling point in a clear iron vessel, gradually mix with it the slaked lime, and continue the ebullition for ten minutes with constant stirring. Remove the vessel now from the fire, and when by the subsidence of the insoluble matters, the supernatant liquor has become perfectly clear, transfer it by means of a syphon to a green-glass bottle, furnished with an air-tight stopper. The specific gravity of this solution is 1056," D. "Carbonate of soda, ℥xxj.; lime, ℥ix.; boiling distilled water, cong. j.; prepare the liquor in the manner directed for *Liquor Potassæ.* Specific gravity, 1·061," L.

This solution is used in the preparation of the *Valerianate of Soda* of the last edition of the Dublin Pharmacopœia, and of the *Oxysulphuret* of *Antimony* of the London. In the latter pharmacopœia it is stated that of the officinal solution "100 grains contain four grains of soda, and that it agrees with what was before observed respecting the solution of potash, excepting the last characteristic," (see page 13.)

SODÆ PHOSPHATIS SOLUTIO, E.—*Solution of Phosphate of Soda.*

PREPARATION.—Phosphate of soda, free of efflorescence, 175 grains; distilled water, f℥viij.; dissolve the salt in the water, and keep the solution in well-closed bottles.

Phosphate of soda has been described in the division *Cathartics.* This solution is only employed as a test.

STANNI PROTOCHLORIDUM, L.—*Protochloride of Tin.* This solution, which is used to detect the presence of free chlorine in hydrochloric acid, (from its property of producing a peculiar purple tint with any salt of gold, the metal in leaf having been previously digested in the acid), is prepared by dissolving with heat an excess of granulated tin in hydrochloric acid, and straining the solution.

ZINCI CHLORIDI LIQUOR, D.—*Solution of Chloride of Zinc.*

PREPARATION.—Take of sheet zinc, ℔j.; muriatic acid of commerce; water, of each, Oiiss, or as much as may be sufficient; solution of chlorinated lime, f℥j.; prepared chalk, ℥j. To the zinc, introduced into a porcelain capsule, gradually add the muriatic acid, applying heat until the metal is dissolved. Filter the liquid through calico, and, having added to it the solution of chlorinated lime, concentrate at a boiling temperature, until it occupies the bulk of one pint. Permit the solution now to cool down to the temperature of the air, place it in a bottle with the chalk, and having first added distilled water, so that the bulk of the whole may be a quart, shake the mixture occasionally for twenty-four hours. Finally, filter, and preserve the product in a well-stopped bottle.

The specific gravity of this liquor is 1593.

This solution has been recently very much employed as a deodorising agent, for which purpose it was first proposed by Sir William Burnett; and its effects as such are most valuable. In pharmacy it is used for the preparation of the *Chloride of Zinc* of the last edition of the Dublin Pharmacopœia.

ZINCUM, D. L. E.—*Zinc. Metallic Zinc.*

Zinc is employed in pharmacy for preparing the different compounds of the metal which are used as medicines. As met with in commerce it frequently contains many impurities,—carbon, iron, copper, arsenic, &c. The London and Edinburgh Colleges have therefore given the following tests, by which it may be ascertained if it is sufficiently pure for the above purpose:—"The specific gravity of the metal is 6·86; it is dissolved by nitric acid; what is thrown down from the solution by ammonia is again dissolved, when the ammonia is added in excess," L. "It dissolves in a great measure in diluted sulphuric acid, leaving only a scanty grayish-black residuum. This solution presents the characters of the solution of sulphate of zinc," E.

APPENDIX A.

FORMULÆ.

ANTACIDS.

℞ Aquæ Ammoniæ, min. x.; Infusi Chirettæ, fʒvij.; Tincturæ Aurantii, fʒj. M. Fiat haustus, mane meridieque sumendus. (A useful antacid draught in the dyspepsia of the debilitated, attended with acid eructations.)

℞ Ammoniæ Bicarbonatis, gr. viij.; Infusi Calumbæ, fʒvij.; Tincturæ Lupuli (L.), fʒj.; Tincturæ Hyoscyami, min. xx. M. Fiat haustus, bis quotidie sumendus. (Less stimulating than the former, and better adapted for cases in which the stomach is irritable.)

℞ Ammoniæ Sesqui-carbonatis, gr. xxiv.; Fellis Bovini Inspissati, ʒss.; Mucilaginis, q. s. M. Fiant pilulæ duodecim; Capiat unam ter in die. (In dyspepsia accompanied by vomiting of food and constipation.)

℞ Aquæ Ammoniæ Carbonatis, f℥ss.; Infusi Cascarillæ, f℥vij.; Spiritus Ætherei Nitrosi, fʒj.; Spiritus Cinnamomi, f℥iij. M. Fiat mistura, de quâ sumantur cochlearia ij. ampla ter in die. (In the lithic acid diathesis, with debility of the digestive organs.)

℞ Aquæ Calcis, f℥iv.; Confectionis Aromaticæ, ʒij.; Tere simul et gradatim adde, Misturæ Amygdalarum, f℥iiiss.; Aquæ Lauro-cerasi, fʒij. Fiat mistura; Capiat cochlearia ij. ampla bis terve in die, phialâ prius concussâ. (Useful in cardialgia and in gastrodynia.)

℞ Aquæ Calcis Effervescentis (*Carrara water*, page 9); Lactis Recentis, ana, f℥ij.; fiat haustus, ter quaterve in die sumendus. (In dyspepsia, with much irritability of the stomach, and cardialgia.)

℞ Misturæ Cretæ, f℥vj.; Tincturæ Lupulinæ, f℥j.; Tincturæ Cardamomi Compositæ, fʒvij.; Vini Opii, fʒj. M. Capiat semiunciam sextis horis. (In diarrhœa dependant on acidity of the *primæ viæ*.)

℞ Pulveris Cretæ compositi, gr. xviij. ; Carbonatis Sodæ siccati, gr. vj. ; Pulveris Tragacanthæ, gr. xij. M. Divide in partes sex æquales, quarum capiat unam quâque secundâ vel tertiâ horâ. (In the diarrhœa of children.)

℞ Aquæ Magnesiæ Bicarbonatis, fʒvijss. ; Tincturæ Lavandulæ compositæ, fʒss. M. Fiat haustus, sumat statim et repetatur semihorio si opus sit. (An excellent remedy in heartburn.)

℞ Solutionis Alkalinæ *(Brandish)*, fʒv. ; Infusi Chirettæ, f℥x. ; Essentiæ Anisi, fʒiij. ; Syrupi Aurantii, f℥j. M. Fiat mistura ; Capiat cochlearia ij. magna ter in die. (In the lithic acid diathesis.)

℞ Liquoris Potassæ effervescentis, f℥iv. ; Tincturæ Chirettæ ; Tincturæ Lupulinæ, ā ā, fʒss. ; Fiat haustus, ex effervescentiâ sumendus, et repetatur ter in die. (An excellent antacid draught in dyspepsia with deposit of lithates in the urine. This draught is best prepared by putting the tinctures mixed together into a tumbler, and pouring the effervescing potash water on them ; it should be swallowed immediately.)

℞ Liquoris Potassæ effervescentis, f℥iij. ; Vini Seminum Colchici, min. xx. ; Tincturæ Cardamomi compositæ, fʒss. Fiat haustus ter in die sumendus. (In dyspeptic affections occurring in gouty habits : see observations on last prescription, for preparation.)

℞ Sodæ Bicarbonatis, gr. x. ; Infusi Calumbæ, f℥iss. ; Aquæ Lauro-cerasi, min. xij. ; Creasoti, min. j. M. Fiat haustus sextis horis sumendus, et ad tertiam vel quartem vicem repetendus si opus sit. (In acidity of the stomach with vomiting.)

℞ Sodæ Carbonatis siccati, ʒss. ; Pulveris Myrrhæ, gr. xviij. ; Pulveris Ipecacuanhæ, gr. iij. M. Divide in chartulas vj. quarum unam sumat quartâ quâque horâ. (An excellent antacid in chronic diarrhœa and dysentery.)

ANTHELMINTICS.

℞ Syrupi Allii sativi, (page 24), f℥j. ; Olei Terebinthinæ, f℥ss. ; Decocti Hordei, f℥vij. M. Fiat enema, injiciatur statim, et horæ unius spatio adhibeatur enema catharticum. (For ascarides in the rectum ; Half or a fourth part of the above may be used for children.)

℞ Pulveris Absinthii, gr. xxx. ; Calomelanos, gr. vj. ; Muriatis Sodæ, gr. xij. ; Saponis Jalapini (page 120), gr. xxiv. ; Mellis Despumati, q. s. M. Divide in bolos ij. ; Sumat unum mane, et alterum post horas sex, nisi priús benè dejecerit alvus. (In cases of lumbrici or ascarides.)

℞ Infusi Absinthii, f℥ij. ; Infusi Gigartinæ, (page 26), f℥iss. : Tincturæ Valerianæ ; Syrupi Zingiberis, ā ā, fʒij. M. Fiat mistura, Capiat partem quartem trihorio. (For expelling lumbrici.)

℞ Extracti Filicis, (page 25), min. xxx. ; Misturæ Amygdalæ, f℥ij. M. Fiat emulsio, et divide in partes æquales ij., quarum sumatur una horâ somni, et altera mane sequente. (A most efficacious anthelmintic for the *tape worm*. If it do not purge, an active cathartic should be given in four hours after the second dose.)

℞ Mucunæ, ʒss. ; Pulveris Spigeliæ, gr. xij. ; Syrupi, f℥ss. ; in mortario terendo misce intimè. (An excellent anthelmintic in cases of lumbrici ; the above quantity should be administered for three successive mornings before breakfast, and the third dose followed by an active mercurial purge.)

℞ Granati radicis corticis, ʒiij. ; Pulveris Sabadillæ, gr. vj. ; Pulveris Aromatici, ʒss. M. Divide in pulveres sex ; Capiat unum omni semihorâ ad sextam vicem. (In cases of tænia ; the last dose should be followed by an active saline purge.)

℞ Pulveris Spigeliæ, gr. x. ; Pulveris Stanni, ʒij. ; Syrupi Zingiberis, fʒss. ; Mellis, q. s. M. Fiat bolus, horâ ante jentaculum sumendus, et per dies tres repetendus ; postea adhibeatur mistura purgans ad plenam alvi solutionem. (In cases of lumbrici.)

℞ Infusi Spigeliæ, f℥j. ; Infusi Allii, fʒj. ; Confectionis Terebinthinæ ʒij. ; Tincturæ Sennæ, fʒj. ; Fiat haustus. (An effectual anthelmintic in cases of lumbrici.)

ANTISPASMODICS.

℞ Ticturæ Fuliginis, f℥ss. ; Misturæ Camphoræ cum Magnesiâ, f℥viss. ; Syrupi Aurantii, f℥j. M. Fiat mistura, Capiat unciam omni horâ donec abierit spasmus. (In hysteria of females.)

℞ Spiritus Fuliginis, fʒss. ; Aquæ Sodæ carbonatis, fʒij. ; Syrupi Aurantii, fʒiss. ; Aqua Menthæ pulegii, f℥iss. M. Fiat mistura, sumat cochleare medium tertiis vel quartis horis. (In the advanced stages of hooping-cough in children ; a tea-spoonful for infants.)

℞ Extracti Fuliginis, gr. xxx. ; Pilulæ Assafœtidæ compositæ, ℈j. ; Olei Valerianæ, min. x. M. Divide in pilulas duodecim, quarum capiat duas ter in die. (In hysterical neuralgia in females.)

℞ Tincturæ Assafœtidæ, fʒss. ; Spiritus Ammoniæ aromatici, fʒss. ; Aquæ Lauro-cerasi, fʒss. ; Misturæ Camphoræ cum Magnesiâ, fʒviss. M. Fiat haustus. (A useful antispasmodic in hysteria and spasmodic colic.)

℞ Tincturæ Castorei compositæ, fʒv.; Spiritus Ætherei Oleosi, fʒiij.; Infusi Valerianæ, f℥vij.; M. Fiat Mistura, de quâ sumatur cochleare unum magnum secundis horis, donec evanescant symptomata. (In cramp of the stomach, in spasmodic or flatulent colic, in hysteria, in hiccup, in nervous palpitations, &c.)

℞ Pilulæ Assafœtidæ compositæ, gr. xl.; Olei Rutæ, min. xv.; fiant pilulæ duodecim. Capiat duas vel tres pro dosi. (In the flatulent colic of hysteria.)

℞ Zinci Valerianatis, gr. viij.; Tincturæ Valerianæ, fʒij.; Aquæ Florum Aurantii, f℥iiiss.; Syrupi Hemidesmi, fʒij.; fiat mistura cujus capiat semiunciam sextis horis. (An excellent mixture in hysteria, chorea, and other nervous affections.)

℞ Valerianatis Quinæ, gr. ix.; Extracti Gentianæ, gr. xxiv.; fiant pilulæ duodecim, quarum capiat unam ter in die. (In nervous debility, hysteria, &c.)

ASTRINGENTS.

℞ Aceti Destillati, f℥ij.; Aquæ Lauro-cerasi, fʒij.; Syrupi Rhæados, fʒvj.; Aquæ destillatæ, f℥v. M. Fiat mistura, cujus capiat cochlearia duo ampla sextis horis. (An excellent sedative astringent in chronic mucous or purulent discharges, attended with much debility and irritability of the stomach.)

℞ Acidi Gallici, gr. xx.; Mucilaginis Acaciæ, fʒij.; Aquæ destillatæ, f℥iiiss.; Syrupi Rhæados, fʒij. M. Fiat mistura, de quâ sumatur uncia secundis vel tertiis horis. (In hemorrhage from the kidneys or bladder.)

℞ Acidi Sulphurici aromatici, fʒiiss.; Syrupi Rosæ Gallicæ, fʒvss.; Aquæ destillatæ, f℥vij. M. Fiat mistura, sumat unciam sextis horis. (A useful astringent mixture in passive hemorrhages, and in the colliquative sweating of hectic.)

℞ Tincturæ Cinnamomi compositæ, fʒij.; Acidi Sulphurici diluti, fʒvj. Fiat mistura, cujus capiat guttas xx. ter in die, ex cyatho Decocti Hordei. (In the same cases as the above mixture.)

℞ Aluminis, ʒiss.; Syrupi Rosæ Gallicæ, f℥j.; Aquæ Rosæ, f℥vij. M. Fiat mistura cujus sumat cochleare amplum tertiis vel quartis horis. (In old cases of diarrhœa, and in painter's colic.)

℞ Infusi Rosæ acidi; Misturæ Althææ, ana, f℥iij.; Aluminis, ʒj.; Mellis Rosæ, fʒij. M. Fiat gargarisma, sæpè utenda. (A useful gargle in relaxed sore throat, and in chronic ulceration of the mouth and fauces.)

℞ Creasoti, min. j.; Spiritus Juniperi compositi, min. xx.; Aquæ destillatæ, f℥j. M. Fiat haustus, secundis vel tertiis horis sumendus. (In chronic diarrhœa with vomiting.)

℞ Creasoti, min. iv.; Tincturæ Gallæ, fʒij.; Aquæ destillatæ, f℥ij. M. Fiat lotio. (In indolent ulcers with excessive discharge.)

℞ Sulphatis Ferri; Carbonatis Potassæ, ana, ʒss.; Mucilaginis Gummi Tragacanthæ, q. s. Fiat massula et divide in pilulas xij.; Capiat unam ter in die. (An excellent remedy in leucorrhœa.)

℞ Ferri Pernitratis Liquoris, fʒiij.; Syrupi simplicis, fʒv.; Aquæ destillatæ, f℥iij. M. Capiat cochleare amplum sextis horis. (A very useful astringent and tonic mixture in chronic mucous diarrhœa, and in leucorrhœa.)

℞ Sulphatis Cupri, gr. vj.; Pulveris Myrrhæ, gr. xij.; Confectionis Rosæ, gr. xl. M. Divide in pilulas xij.; Sumat unam sextis horis. (In chronic diarrhœa and dysentery.)

℞ Tincturæ Gallæ, f℥j.; Misturæ Amygdalæ, f℥iss.; Mucilaginis, f℥ss.; Aquæ, ℥v. M. Capiat cochleare amplum post singulas liquidas dejectiones. (An excellent astringent mixture in colliquative diarrhœa.)

℞ Pulveris Kino compositi, gr. x.; Pulveris Cretæ compositi, gr. xv.; Syrupi Zingiberis, q. s. M. Fiat bolus, sextâ quâque horâ sumendus. (In diarrhœa occurring in the old and debilitated.)

℞ Decocti Hæmatoxyli, f℥viss.; Tinctura Monesiæ, f℥j.; Syrupi Aurantii, f℥ss. Fiat mistura, cujus capiat cochleare amplum post singulas liquidas dejectiones. (In chronic diarrhœa and dysentery.)

℞ Monesiæ, gr. lx.; Aluminis, gr. xxiv.; Confectionis Aromaticæ, gr. xxx. Syrupi, q. s. ut fiant pilulæ xxiv.; Sumat ij. ter in die. (In leucorrhœa, in chronic diarrhœa, and in pyrosis.)

℞ Tincturæ Matico, fʒvj.; Infusi Krameriæ, f℥vij.; Syrupi Croci, fʒij. M. Fiat mistura cujus capiat semunciam tertiis vel quartis horis. (In chronic mucous diarrhœa or in the diarrhœa of phthisis.)

℞ Plumbi Acetatis; Digitalis, ana, gr. vj.; Opii, in pulvere, gr. iij.; Confectionis Rosæ, gr. xij. M. Divide in pilulas sex, e quibus una ter in die sumatur. (In active hemorrhages.)

℞ Plumbi Acetatis, gr. ix.; Pilulæ Saponis compositæ, gr. v. M. Divide in pilulas tres, quarum capiat unam tertiis vel quartis horis. (An excellent remedy in the autumnal cholera of this country.)

℞ Decocti Tormentillæ, f℥vj.; Decocti Papaveris, f℥ij.; Acidi Tannici, gr. xviij.; M. Fiat liquor, cujus quantum satis sit quater de die, ope siphunculi eburnei, in vaginam injiciatur. (In chronic leucorrhœa.)

℞ Acidi Tannici, gr. xij.; Confectionis Rosæ, gr. xxxij. M. Divide in pilulas xij. e quibus sumatur una quartis horis. (An excellent astringent in the colliquative sweating and diarrhœa of phthisis.)

℞ Decocti Granati, f℥vij.; Mellis Boracis, f℥j. M. Sit gargarisma sæpè utendum. (In aphthous ulcerations of the mouth and fauces.)

℞ Sulphatis Zinci, ℈j.; Aquæ destillatæ, f℥iv.; Tincturæ Croci, fʒij. M. Fiat collyrium, sæpè utat. (A useful eye-wash in chronic ophthalmia.)

℞ Pulveris Uvæ-ursi, ʒij.; Acidi Tannici, gr. vj.; Pulveris Opii, gr. ij. M. Divide in portiones duodecim æquales; Capiat unam ter in die. (In passive hematuria, in albuminuria, and in chronic catarrh of the bladder.)

℞ Sulphatis Zinci, gr. xxiv.; Ipecacuanhæ, gr. iv.; Pulveris Myrrhæ, gr. xxiv.; Lactucarii; Confectionis Rosæ, ana, ʒss. M. Divide in pilulas xxiv. e quibus sumatur una sextâ quâque hora. (In chronic diarrhœa and dysentery.)

℞ Calcis Chlorinatæ, ʒiv.; Aquæ destillatæ, f℥xj.; Solve et cola, dein adde, Syrupi Florum Aurantii, f℥j. M. Fiat liquor, quo gingivas sæpè gargarizet. (A most efficacious gargle in excessive salivation.)

℞ Tincturæ Acetatis Zinci, fʒij.; Infusi Matico, f℥viiss.; Mucilaginis Gummi Tragacanthæ, fʒij. M. Fiat injectio, frequenter utenda. (An excellent injection in the advanced stages of gonorrhœa, in gleet, and in leucorrhœa.)

CATHARTICS.

℞ Decocti Aloës compositi, f℥iij.; Syrupi Croci, f℥ss.; Syrupi Rhei, f℥ss. M. Fiat mistura duabus vicibus sumenda. (In torpidity of the bowels, and in chlorosis.)

℞ Calomelanos, gr. xxx.; Saponis Crotonis, gr. vj.; Pilulæ Colocynthidis et Hyoscyami, gr. xxiv. M. Divide in pilulas xij. e quibus sumatur una ter de die. (In spasmodic and nervous diseases.)

℞ Pilulæ Colocynthidis compositæ; Saponis Jalapinæ, ana, gr. lx. M. Fiat massula et divide in pilulas xxiv. e quibus sumantur duæ, prout res poscit. (A good formula for purgative pills for general use.)

℞ Pilulæ Cambogiæ compositæ, gr. xl.; Pilulæ Hydrargyri, gr. xx. M. Divide in pilulas xij.; Capiat ij. pro re natâ. (In constipation with deficient secretion of bile.)

℞ Extracti Colchici acetici, gr. xij.; Pilulæ Hydrargyri, gr. xxx.; Extracti Hyoscyami, gr. xviij. M. Fiant pilulæ duodecim, e quibus sumantur duæ tertiâ quâque nocte. (An excellent cathartic in gouty and rheumatic habits, the following draught being administered the next morning.)

℞ Succi Colchici, min. x. ; Magnesiæ Carbonatis, gr. xij. ; Tincturæ Cinnamomi compositæ, fʒss. ; Aquæ Cinnamomi, f℥iss. M. Fiat haustus. (To be given in the morning, two of the above pills having been taken the previous evening.)

℞ Vini Seminum Colchici, f℥ss. ; Tincturæ Rhei et Aloës, fʒj. ; Spiritus Myristicæ, f℥ss. ; Infusum Rhei, fʒvj. M. Fiat mistura, de quà sumantur cochlearia ampla ij. tertiis vel quartis horis ad effectum. (A useful cathartic in gouty and rheumatic habits.)

℞ Tincturæ Colocynthidis, min. xx.; Infusi Sennæ compositi, f℥ij. ; Tincturæ Cardamomi Compositæ, fʒss. M. Fiat haustus, bis quotidie sumendus. (In dropsical cases.)

℞ Tincturæ Elaterii, fʒj. ; Syrupi Sennæ, f℥ss. ; Syrupi Zingiberis, fʒj. ; Aquæ Menthæ Piperitæ, f℥j. M. Fiat haustus, quamprimum sumendus, et, nisi alvus sit intereà copiosè soluta, quadrihorio repetatur. (In ascites occurring in the robust, provided no inflammatory tendency be present.)

℞ Olei Ricini, fʒvj. ; Mucilaginis Gummi Arabici, fʒiv. ; Tere optimè simul, hisque inter terendum paulatim adjice, Syrupi Croci, fʒij. ; Aquæ destillatæ, f℥iss. Fiat haustus. (A safe and efficacious purgative draught.)

℞ Saponis Crotonis, gr. ss. ; Extracti Hyoscyami ; Pilulæ Hydrargyri, ana, gr. iv. Olei Pimentæ, min. ij. M. Divide in pilulas ij. horâ somni sumat.

℞ Tincturæ Hellebori, fʒiss. ; Infusi Sennæ compositi, f℥j. ; Syrupi Zingiberis, fʒj. M. Fiat haustus, primo mane sumendus. (The above pills and draught will be found very useful in cephalalgia dependent on congestion of the vessels of the head, and accompanied by a torpid state of the bowels ; also in mania.)

℞ Hydrargyri cum Cretâ, gr. xij. ; Pulveris Scammonii, gr. xij. ; Carbonatis Sodæ siccati, gr. vj. ; Pulveris Aromatici, gr. xij. M. Divide in portionibus paribus vj., e quibus sumatur una omni mane. (An excellent alterative and cathartic for children ; very useful in worm cases.)

℞ Lini Cathartici, herbæ recentis, ʒiij. ; Aquæ ferventis, f℥ij. ; Digere per horas duas in vase clauso, cola et adde, Tincturæ Cardamomi compositæ, fʒj. Fiat haustus. (In simple constipation.)

℞ Resinæ Jalapæ, gr. v. ; Confectionis Amygdalarum, gr. xxx. ; Simul terantur, hisque inter terendum adde, Aquæ destillatæ, f℥iss. M. Fiat haustus, illicò sumendus. (An excellent cathartic in simple constipation.)

℞ Sulphatis Magnesiæ, ʒvj. ; Infusi Rosæ acidi, f℥ij. M. Fiat haustus. (An excellent purgative draught in mild febrile and inflammatory affections, accompanied by constipation.)

℞ Manganesiæ Sulphatis, ʒiv.; Vini Seminum Colchici, min. xxx.; Aquæ Rosæ, f℥iv. M. Fiat haustus. (A useful purgative draught in gouty or rheumatic habits.)

℞ Manganesiæ Sulphatis, ʒiv.; Acidi Sulphurici diluti, min. viij.; Infusi Sennæ compositi, f℥ij. M. Fiat haustus. (An excellent purgative draught in dyspeptic affections with deficient secretion of bile.)

℞ Mannitæ, gr. xxx.; Aquæ Menthæ piperitæ, f℥ss. Solve; Fiat haustus. (An excellent laxative for children.)

℞ Potassæ Sulphatis, ℥ss.; Acidi Sulphurici diluti, min. v.; Aquæ Rosæ, f℥ij. M. Fiat haustus. (In mild febrile and inflammatory affections.)

℞ Potassæ Bitartratis, ℥iv.; Acidi Boracici, ʒj.; Aquæ destillatæ, f℥xij. Fiat mistura, pars quarta cujus tertiâ quâque horâ ad plenam alvi solutionem sumatur. (In dropsical effusions, more especially into the abdomen.)

℞ Potassæ Bitartratis, ℥ss.; Pulveris Jalapæ, gr. xxx.; Confectionis Sennæ, ℥iss.; Extracti Sennæ fluidi, f℥ss. M. Fiat electuarium, de quo sumatur instar nucis moschatæ, ter quotidie, vel donec alvus commodè purgetur. (In hemorrhoidal affections.)

℞ Infusi Sennæ compositi, f℥iss.; Syrupi Rhei, f℥ij.; Spiritus Nucis Moschatæ, f℥ss. M. Fiat mistura, de quâ sumantur cochlearia ij. ampla secundis horis donec alvus leniter dejecerit. (In simple constipation of the old or debilitated.)

℞ Extracti Sennæ fluidi; Vini Rhei, āā, fʒij.; Aquæ Cinnamomi, f℥iss. M. Fiat haustus. (A purgative draught, suited for cold leucophlegmatic habits.)

℞ Mellis Violæ; Mannæ, ana, ℥ss.; Syrupi Violæ, q. s. Fiat electuarium, cujus capiat cochleare parvulum pro re natâ. (A mild laxative readily taken by children.)

℞ Resinæ Scammonii, gr. v.; Confectionis Amygdalarum, gr. xxx.; Simul terantur, hisque inter terendum adde, Aquæ destillatæ, f℥iss. M. Fiat haustus. (An excellent cathartic in simple constipation. The dose for children is one-third, or one-half of the above.)

℞ Pulveris Scammonii, gr. xxx.; Pulveris Jalapæ, gr. lx.; Syrupi Aurantii, et Mucilaginis, ana, q. s. ut fiant pilulæ xxiv. e quibus sumantur duæ alternis horis, vel donec bis dejecerit alvus. (In the constipation of lead colic.)

℞ Resinæ Jalapæ; Calomelanos; Saponis Hispanici, ana, gr. xv.; Olei Caryophylli, min. vj. M. Divide in pilulas xij. e quibus sumatur una semihorio ad plenam alvi solutionem. (In obstinate constipation.)

℞ Sodæ Hyposulphitis, ℨij. ; Aquæ Menthæ piperitæ, fℨxiv. ; Tincturæ Cardamomi compositæ, fℨij. M. Fiat haustus. (An active cathartic draught in the constipation of atonic dyspepsia.)

℞ Sodæ Sulphatis, ℨv. ; Infusi Rosæ acidi, f℥iss. ; Acidi Sulphurici diluti, min. ij. M. Fiat haustus. (A useful antiphlogistic cathartic.)

℞ Sodæ Phosphatis, ℨiv. ; Aquæ Menthæ piperitæ, f℥iij. ; Solve, dein adde, Extracti Sennæ fluidi, f℥ss. Fiat mistura, de quâ capiat cochleare amplum secundis horis donec alvus commodè moveatur. (A useful purgative mixture.)

℞ Olei Terebinthinæ ; Olei Ricini, ana, fℨiij. ; Decocti Hordei, f℥vj. M. Fiat enema. (The best purgative in *purpura hæmorrhagica* occurring in children ; it may be administrated twice daily until the spots begin to fade.)

CAUSTICS.

℞ Chloridi Zinci, ℨss. ; Antimonii Terchloridi Liquoris, min. xv. ; Farinæ, ℨj. ; Aquæ destillatæ, q. s. Fiat massa, quâ pars morbida exedatur. (An excellent caustic paste in cancer, and lupus.)

℞ Chloridi Zinci, ℨss. ; Farinæ, ℨj. *vel*, ℨij. *vel*, ℨiij. M. Fiat massa. (The above proportions of flour may be used according to the strength the caustic paste is wished to be ; it is employed in the same cases as the former.)

℞ Arsenici Albi, partes vj. ; Calomelanos, partes xcvj. M. Fiat pulvis. DUPUYTREN. (Sprinkled on lint, and applied in small portions at a time to open cancer ; the practice is not unattended with danger.)

℞ Hydrargyri Pernitratis Liquoris, fℨij. ; Pulveris Tragacanthæ, quantum sufficit ut fiat massa. (A caustic paste for cancer and lupus.)

℞ Hydrargyri Oxydi rubri ; Aluminis siccati, ana, ℨj. M. Fiat pulvis. (Sprinkled on the parts to repress exuberant and spongy granulations.)

℞ Hydrargyri Oxydi rubri ; Amyli, ana, ℨss. ; Sacchari Puri, ℥j. Misce benè terendo simul, ut fiat pulvis subtillissimus. (In thickening of the cornea, to be blown into the eye three or four times a day.)

℞ Carbonatis Cupri, ℨij. ; Adipis præparati, ℥j. M. Fiat unguentum. DEVERGIE. (In the chronic forms of eczema and impetigo of the scalp, where stimulating applications are admissible.)

DIAPHORETICS.

℞ Antimonii Oxydi, gr. xl. ; Muriatis Morphiæ, gr. iss. ; Confectionis Rosæ, q. s. Fiant pilulæ xxiv. e quibus sumantur duæ, tertiis horis. (In chronic cutaneous diseases, and in chronic rheumatism.)

℞ Pulveris Antimonialis, gr. iij. ; Calomelanos, gr. ss. ; Extracti Hyoscyami, gr. iss. M. Fiat pilula, sumenda quâque tertiâ horâ. (In acute rheumatism, and in mild febrile affections with a harsh dry skin.)

℞ Antimonii Tartarizati, gr. ij. ; Decocti Dulcamaræ, f℥viiss. ; Syrupi Hemidesmi, f℥ss. M. Fiat mistura, de quâ capiat cochleare amplum secundis horis. (An excellent diaphoretic mixture in febrile and inflammatory affections.)

℞ Tincturæ Guaiaci Ammoniatæ, fʒij. ; Mucilaginis Gummi Tragacanthæ, fʒij. ; Tere simul, et paulatim adjice, Misturæ Amygdalæ, f℥iiiss. Fiat mistura, sumenda in die partitis vicibus. (In atonic gout, in chronic rheumatism, and in chronic cutaneous diseases.)

℞ Sarsaparillæ radicis incisæ, ℥iss. ; Aquæ destillatæ ferventis, Oj. Macera per horas duodecim in vase clauso, subinde agitans, dein cola.

℞ Hujus infusi, f℥x. ; Infusi Sassafras ; Decocti Mezerei, ana, f℥iiss. ; Syrupi Hemidesmi, f℥j. M. Fiat Mistura, de quâ sumatur cyathum vinarium ter quarterve in die. In secondary syphilitic affections, particularly the forms of cutaneous disease.)

℞ Resinæ Guaiaci, gr. xij. ; Olei Sassafras, min. v. ; Theriacæ, quantum sufficit ut fiat bolus, ter quarterve in die sumendus. (In chronic rheumatic affections, more especially when of syphilitic origin.)

DIURETICS.

℞ Decocti Pyrolæ, f℥vij. ; Nitratis Potassæ, gr. xxx. ; Spiritus Ætherei Nitrosi, f℥ss. ; Spiritus Juniperi compositi, fʒiij. M. Fiat mistura ; Capiat cochleare amplum quâque tertiâ horâ. (A stimulating diuretic in old cases of dropsy.)

℞ Tincturæ Buchu, f℥ss. ; Decocti Uvæ Ursi, f℥viiss. M. Fiat mistura, cujus capiat unciam quater in die. (In chronic catarrh of the bladder, and in chronic mucous discharges from the vagina or urethra.)

℞ Extracti Pareiræ, gr. lx. ; Carbonatis Sodæ siccati, gr. xij. ; Extracti Conii, gr. vj. ; Syrupi Papaveris, q. s. ut fiant pilulæ xxiv. ; Capiat ij. sextâ quâque hora. (In calculous affections, and in chronic catarrh of the bladder.)

℞ Bitartratis Potassæ, ℥ss. ; Ureæ, ʒij. ; Mellis, ℥ss. M. Fiat electuarium, de quo capiat instar nucis moschatæ, ter quotidie. (In anasarca or ascites, with deficient secretion of urine.)

℞ Pulveris Scillæ, gr. xxx. ; Potassæ Acetatis, ʒss. ; Aceti Scillæ, fʒij. ; Mellis, ℥j. ; Olei Juniperi, min. xx. M. Fiat electuarium, de quo capiat instar nucis moschatæ sextis horis. (In old cases of anasarca.)

℞ Amygdalarum Dulcium decorticatarum, ℥j. ; Cantharidum, in pulvere subtilo, gr. x. ; Sacchari Puri, ʒss. ; Tere benè simul, et gradatim adjice, Aquæ tepidæ, f℥x. Cola. Liquoris colatæ capiat cochleare amplum tertiis horis. (In torpor of the kidneys, and in incontinence of urine caused by paralysis of the neck of the bladder.)

℞ Boracis gr. xxx. ; Decocti Pareiræ, f℥xij. M. Fiat mistura, de quâ sumatur cyathum vinarium sextis horis. (In chronic mucous discharges from the bladder with excess of uric acid.)

℞ Tincturæ Buchu ; Tincturæ Matico, ana, f℥ss. ; Decocti Pareiræ ; Decocti Uvæ Ursi, ana, f℥viiss. M. Fiat mistura, cujus capiat cochlearia duo ampla sextis horis. (In chronic catarrh of the bladder in old persons.)

℞ Olei Terebinthinæ, fʒj. ; Gummi Tragacanthæ, ʒss. ; Syrupi Aurantii, f℥j. ; Tere bené simul, et gradatim adjice, Aquæ Menthæ Piperitæ, f℥vj. ; Spiritus Ætherei Nitrosi, fʒij. M. Capiat cochleare amplum, quâque secundâ horâ. (A stimulating diuretic.)

EMETICS.

℞ Ammoniæ Sequicarbonatis, gr. xxx. ; Infusi Senegæ, f℥j. ; Syrupi Croci, fʒij. M. Fiat haustus statim sumendus. (In the suffocative catarrh of typhus.)

℞ Emetinæ impuræ, gr. ij. ; Syrupi Aurantii florum, f℥j. ; Aquæ destillatæ, f℥iij. M. Capiat cochleare amplum semihorio, donec supervenerit vomitio. (A certain emetic, applicable to the same cases as Ipecacuanha.)

℞ Violæ odoratæ radicis, ʒss. ; Syrupi Scillæ, fʒj. M. Fiat Bolus statim sumendus, et post horam repetendus si opus sit. (An excellent substitute for Ipecacuanha.)

℞ Sinapis, ℥j. ; Aquæ tepidæ, f℥xij. M. Fiat Mistura statim sumenda. (An excellent stimulating emetic, particularly useful when the vital powers are sinking.)

EMMENAGOGUES.

℞ Ergotinæ, gr. xij.; Syrupi Croci, fʒss.: Aquæ Menthæ piperitæ, f℥iiiss. M. Fiat mistura cujus capiat cochlearia ampla duo quartâ parte horæ ad effectum. (To accelerate delivery.)

℞ Tincturæ Ergotæ, fʒiss.; Syrupi Croci, f℥ij.; Decocti Aloës compositi, f℥vj. M. Fiat mistura, cujus capiat cochlearia ampla ij. sextis horis. (In amenorrhœa, with torpor of the circulation.)

℞ Tincturæ Ergotæ Æthereæ, f℥j.; Infusi Sabinæ, f℥iv.; Syrupi Croci, f℥ss. M. Fiat mistura de quâ sumatur cochleare magnum ter in die. (In chlorotic amenorrhœa after the use of ferruginous preparations for some time.)

℞ Sulphatis Ferri siccati, gr. xx.; Pilulæ Aloës cum Myrrhâ, gr. lx.; Olei Rutæ, min. vj. M. Fiat massula et divide in pilulas xxiv. e quibus sumantur ij. bis quotidie. (Useful in chlorosis.)

℞ Ergotæ, gr. xlviij.; Theriacæ, q. s.; Olei Sabinæ, min. xij. M. Fiat electuarium cujus capiat sextam partem ter de die. (In amenorrhœa dependant on simple atony of the uterine organs.)

EMOLLIENTS.

℞ Olei Olivæ, fʒij.; Vitelli Ovi unius; Syrupi Althææ, f℥ij.; Decocti Lini compositi, f℥iij. Fia mistura secundum artem; capiat æger cochleare amplum subindè. (In inflammatory affections of the kidneys, in ardor urinæ, and as a general demulcent.)

℞ Decocti Hordei compositi, f℥x.; Syrupi Hemidesmi, f℥ij. M. Fiat mistura cujus sumantur cochlearia ampla duo interdum. (An agreeable demulcent and excellent mixture, useful in inflammations of the mucous membranes.)

℞ Decocti Tussilaginis; Misturæ Amygdalæ, ana, f℥v.; Syrupi Hemidesmi, f℥ij. M. Fiat mistura, de quâ capiat cochlearia ampla duo horis intermidiis. (A useful demulcent mixture iu chronic bronchitis.)

℞ Decocti Althææ, f℥vj.; Decocti Glycirrhizæ, f℥j.; Tincturæ Opii camphoratæ, fʒij.; Syrupi Hemidesmi, fʒvj. M. Fiat mistura, capiat cochleare amplum tussi urgenti. (In the troublesome cough of phthisis and of chronic bronchitis.)

℞ Camphoræ, rasæ et redactæ, gr. x.; Glycerinæ, f℥j.; Unguenti Ceræ albæ, ʒvij.; M. Fiat unguentum. (To allay the itching attendant on some cutaneous diseases.)

℞ Sodæ Carbonatis, gr. xx. ; Aquæ Florum Sambuci, f℥viiss. ; Glycerinæ, f℥ss. ; M. Fiat lotio. (For the same purposes as the above ointment, especially applicable to eruptions on the scalp.)

EPISPASTICS.

℞ Cantharidum, in crasso pulvere, ℥iv. ; Acidi Acetici Glacialis, f℥ij. ; Spiritus Vini rectificati, Oj. Digere in vase vitreo clauso per dies tres, dein exprime et cola ; Tinctura destillat calore gradûs 160° F. ad idoneam spissitudinem. (By this process a syrupy-looking extract is obtained, which, spread thinly on paper and applied to the skin, vesicates rapidly and freely.)

℞ Terebinthinæ vulgaris ; Mastiche, ana, partes sex ; Cantharidum, in pulvere, partes duas ; Euphorbiæ pulveris, partem unam. M. (For a perpetual blister, or to act as a powerful counter-irritant.)

℞ Euphorbiæ, in pulvere subtilo, gr. xxx. ; Adipis præparati, ℥j. M. Fiat unguentum. (An excellent issue ointment, see page 263.)

℞ Olei Terebinthinæ, f℥j. ; Vitelli Ovi unius ; Tincturæ Capsici, f℥iss. ; Cetacei, ℥ss. ; Tere bene, et adde inter terendum, Olei Olivæ, f℥iij. Fiat linimentum. (An excellent rubefacient liniment.)

℞ Linimenti Ipecacuanhæ, (page 263) ; Linimenti Ammoniæ, ana, partes æquales. M. Fiat linimentum. (An excellent counter-irritant, applied with friction.)

EXPECTORANTS.

℞ Syrupi Hemidesmi, f℥iv. ; Tincturæ Balsami Tolutani, f℥ss. ; Tincturæ Opii Camphoratæ, fʒj. ; Vini Ipecacuanhæ, fʒiij. ; Aquæ destillatæ, f℥iij. M. Fiat syrupus expectorans, cujus sumat cochleare amplum quâque secundâ horâ. (In chronic bronchitis.)

℞ Vini Ipecacuanhæ, fʒiij. ; Syrupi Tolutani, fʒv. ; Mucilaginis Acaciæ, f℥j. M. Fiat mistura, capiat cochleare parvum omni horâ vel quâque secundâ horâ. CHEYNE. (For children threatened with an attack of croup or bronchitis.)

℞ Antimonii et Potassæ Tartratis, gr. ij. ; Aquæ destillatæ, f℥vij. ; Aquæ Laurocerasi, fʒij. ; Syrupi simplicis, fʒvj. M. Fiat mistura, de quâ sumatur cochleare amplum bihorio. (In acute attacks of catarrh and bronchitis, combined with general antiphlogistic treatment.)

℞ Pulveris Senegæ, gr. xxx. ; Carbonatis Sodæ siccati, gr. vj. ; Pulveris Scillæ, gr. j. ; Sacchari Lactis, gr. xij. M. Divide in pulveres sex, capiat unum quartâ quâque horâ. (In the advanced stages of hooping cough and bronchitis in children.)

℞ Tincturæ Lobeliæ, fʒij. ; Misturæ Amygdalæ, f℥viss. ; Succi Conii, fʒij. ; Syrupi Hemidesmi, f℥j. M. Fiat mistura, cujus capiat cochleare amplum tertiis horis. (An excellent mixture in asthma and in paroxysmal coughs.)

℞ Pilulæ Ipecacuanhæ compositæ, ʒj. ; Styracis colati, ʒss. ; Pulveris Lobeliæ, gr. xij. M. Divide in pilulas viginti quatuor, e quibus sumantur duæ sextis horis. (In old cases of bronchitis and in humoral asthma.)

NARCOTICS.

℞ Succi Belladonnæ, fʒiv. ; Misturæ Camphoræ, f℥vij. ; Syrupi Rhœados, f℥ss. M. Fiat Mistura, cujus capiat cochleare amplum sextis horis. (An excellent anodyne in neuralgia and tic douloureux.)

℞ Tincturæ foliorum Belladonnæ, fʒij. ; Linimenti Opii, f℥viij. M. Fiat linimentum anodynum, sæpe utendum. (In neuralgic pains and painful glandular enlargements.)

℞ Unguenti Belladonnæ, ℥ij. ; Camphoræ, rasæ et redactæ, ʒj. ; Tincturæ Opii Camphoratæ, fʒj. M. Fiat unguentum. (An excellent application to painful hemorrhoids, and along the urethra in chordee.)

℞ Tincturæ Cannabis Indicæ, fʒj. ; Mucilaginis Gummi Arabici, fʒij. ; Aquæ Cinnamomi, f℥iss. M. Fiat haustus, statim sumendus et repetatur secundis horis vel sæpiùs si minetur morbus. (In tetanus, or hydrophobia ; half the above quantity may be taken every five or six hours in sciatica and other neuralgic pains.)

℞ Succi Hyoscyami, fʒss. ; Misturæ Camphoræ, f℥j. ; Syrupi Rhœados, fʒij. M. Fiat haustus horâ somni sumendus, et repetatur alternâ horâ si non dormiat. (An excellent narcotic draught in cases where from any cause opium is inadmissible.)

℞ Olei Hyoscyami, min. xl. ad fʒij. ; Cataplasmatis Lini, quantum sufficit, ut cataplasma idoneæ magnitudinis fiat. (An admirable poultice in painful glandular enlargements.)

℞ Tincturæ Lactucarii, fʒj. ; Aquæ Destillatæ, f℥j. ; Aquæ Lauro-cerasi, min. xx. Syrupi simplicis, fʒij. M. Fiat haustus, manè et serò sumendus. (An excellent anodyne draught in phthisis.)

℞ Lupulinæ, gr. viij. ; Mucilaginis, q. s. Fiant Pilulæ duæ, horâ decubitûs sumendæ. (A doubtful narcotic, used sometimes in the restlessness and watchfulness of mania and other nervous affections.)

℞ Morphiæ Sulphatis, gr. ¼. ; Extracti Glycirrhizæ, gr. ij. M. Fiat pilula, horâ somni sumat. (For relieving pain and procuring rest.)

℞ Muriatis Morphiæ Liquoris, min. xxx. ; Aquæ florum Aurantii, f℥j. ; Syrupi Aurantii, fʒss. M. Fiat haustus, horâ somni sumendus. (An excellent anodyne draught.)

℞ Morphiæ Sulphatis, gr. ss. ; Acidi Sulphurici diluti, min. ij. ; Aquæ destillatæ, f℥iiss. ; Syrupi Limonum, fʒss. M. Fiat solutio, duabus vicibus sumenda. (An excellent anodyne where night-watchings are troublesome.)

℞ Pilulæ Saponis compositæ, gr. xx. ; Camphoræ, rasæ et redactæ, ʒss. ; Mucilaginis, q. s. M. Divide in pilulas xij., capiat unam quâque sextâ horâ. (In priapism and irritation of the neck of the bladder.)

℞ Liquoris Opii sedativi, min. xx. ; Syrupi Rhœados, fʒij. ; Misturæ Camphoræ, fʒvj. M. Fiat haustus. (A useful anodyne draught in febrile and inflammatory affections.)

℞ Tincturæ Stramonii, min. xv. ; Aquæ destillatæ, fʒvij. ; Syrupi Limonum, fʒss. M. Fiat haustus tertiis horis repetendus, donec dolor mitescat. (Exceedingly useful in tic douloureux, sciatica, and all forms of chronic disease attended with acute pain.)

℞ Extracti Stramonii, gr. ij.; Extracti Hyoscyami, gr. vj.; Extracti Lupuli, gr. xxx. M. Divide in pilulas duodecim, quarum capiat unam quartâ quâque horâ dolorem lenire. (In painful nervous affections and in all forms of chronic disease attended with acute pain.)

℞ Tincturæ Toxicodendri, fʒss. ; Syrupi Papaveris, fʒj. ; Syrupi Limonum, fʒss. Aquæ, f℥iss. M. Fiat haustus. Capiat unum talem sextis horis. (In the acute pains which so frequently attend on chronic paralysis.)

REFRIGERANTS.

℞ Rosæ Caninæ fructûs, ℥j. ; Aquæ ferventis, f℥viij. ; Infunde per horam in vase clauso, exprime et cola, dein adde, Syrupi Mori, fʒij. Fiat mistura, de quâ sumantur cochlearia ampla duo subindè. (An agreeable refrigerant in febrile disorders.)

℞ Acidi Oxalici, gr. v. ; Syrupi Limonum, fʒss. ; Aquæ destillatæ, f℥viiss. M. Fiat mistura, cujus capiat cochlearia ampla duo tertiis horis. (In inflammation of the stomach.)

℞ Syrupi Acidi Citrici, f℥ss. ; Aquæ destillatæ, f℥viiss. ; Tere simul et inter terendo adde, Nitratis Potassæ, ʒss. ; ut fiat solutio. Capiat cochleare amplum bihorio. (A useful refrigerant in hemoptysis with active inflammation.)

℞ Syrupi Aceti, f℥ij ; Aquæ destillatæ, f℥x. M. Fiat mistura, capiat cochleare amplum subinde. (To allay thirst in febrile affections.)

℞ Nitratis Potassæ, gr. xv. ; Aquæ destillatæ, fʒvj. ; Syrupi Limonum, fʒij. M. Fiat haustus, ter in die sumendus. (In active hemorrhages.)

℞ Sodæ Bicarbonatis, gr. xx. ; Aquæ, f℥iss. ; Syrupi simplicis, fʒij. M. Fiat haustus, in effervescentiâ cum succi Limonum recentis cochleari magno subinde sumendus. (To allay thirst in febrile and inflammatory disorders.)

SEDATIVES OR CONTRA-STIMULANTS.

℞ Acidi Hydrocyanici, min. j. ; Aquæ destillatæ, fʒvij. ; Syrupi Simplicis, fʒj. M. Fiat haustus quâque secundâ horâ sumendus donec evanescant symptomata. (In gastric irritability, in nervous palpitations, in angina pectoris, &c.)

℞ Tincturæ Aconiti, min. v. ; Misturæ Camphoræ, f℥j. M. Fiat haustus, sextis horis sumendus donec dolor mitescat. (Most useful in acute rheumatism and in neuralgia ; its effects should be carefully watched.)

℞ Tincturæ Aconiti ; Succi Conii, ana, f℥ss. M. Sit pro lotione. (Exceedingly useful applied over the seat of the pain in tic douloureux.)

℞ Extracti Alcoholici Aconiti, gr. iss. ; Myristicæ adipis, gr. xviij. ; Mucilaginis, q. s. ut fiat massula. Divide in pilulas sex, quarum sumatur una sextis horis. (In chronic rheumatism and other painful affections.)

℞ Chloroformi, min. v. ; Tincturæ Belladonnæ foliorum, min. vj. ; Syrupi Croci, fʒj. ; Aquæ destillatæ, f℥iss. M. Fiat haustus, capiat unum talem ter quarterve in die. (In epileptiform hysteria, and in hysterical neuralgia.)

℞ Chloroformi, min. v. ; Syrupi Rhœados, fʒj. ; Aquæ destillatæ, f℥iss. M. Fiat haustus, urgenti dolore sumendus. (A sedative draught in cancerous and spasmodic diseases.)

℞ Chloroformi, min. xx. ; Cataplasmatis Lini, q. s. Fiat Cataplasma. (An anodyne poultice for cancerous and other painful ulcerations.)

℞ Chloroformi, min. xx. ; Tincturæ Aconiti ; Tincturæ Opii, ana, fʒj. ; Linimenti Camphoræ compositi, fʒxiv. M. Fiat linimentum. (For neuralgic and rheumatic pains.)

℞ Succi Conii, fʒvj. ; Syrupi Aurantii, fʒx. ; Aquæ Cinnamomi, f℥vj. M. Fiat mistura, cujus capiat cochleare amplum ter de die. (In chronic rheumatism, in neuralgia, and in painful spasmodic diseases.)

℞ Creasoti, min. ij. ; Mucilaginis Gummi Arabici, fʒij. ; Aquæ Destillatæ, f℥iss. ; Spiritus Myristicæ, fʒss. M. Fiat haustus quâque secundâ horâ sumendus, donec sedantur vomitiones. (In obstinate vomitings.)

℞ Succi Digitalis, min. xij. ; Misturæ Camphoræ, fʒvj. ; Syrupi Aurantii, fʒij. ; Acidi Hydrocyanici, min. j. M. Fiat haustus, bis terve in die sumendus. (An excellent remedy in nervous palpitations.)

℞ Spiritus Pyroxilici, min. x. ; Syrupi Aceti, fʒij. ; Aquæ, fʒvj. ; M. Fiat haustus, capiat unum talem sextis horis. (A useful anodyne in the hectic of phthisis.)

℞ Cyanidi Potassii, gr. j. ; Aquæ destillatæ, f℥iiiss. ; Syrupi Limonum, f℥ss. M. Divide in haustus octo, sumatur unus pro dosi. DONOVAN. (Used as a substitute for hydrocyanic acid.)

GENERAL STIMULANTS.

℞ Ætheris Acetici, min. xxx. ; Misturæ Camphoræ cum Magnesiâ, f℥j. M. Fiat haustus statim sumendus, et si opus sit post horam repetatur. (In hysteria.)

℞ Ætheris Sulphurici, fʒj. ; Cetacei, gr. ij. ; Tere simul et gradatim adde Aquæ Menthæ Piperitæ, fʒvij. Fiat haustus. (In nervous headache, spasmodic colic, fainting, &c.)

℞ Spiritus Ætherei Oleosi, fʒj. ; Misturæ Camphoræ, fʒvj. ; Tincturæ Cardamomi compositæ, fʒj. M. Fiat haustus statim sumendus, et repetatur bihorio molestente flatulentiâ. (In flatulent colic.)

℞ Spiritus Ætherei Oleosi, fʒss. ; Tincturæ Opii, min. x. ; Misturæ Camphoræ, fʒvj.; Spiritus Anisi compositi, fʒj. M. Fiat haustus sextis horis sumendus. (A useful stimulant in the low stages of fever.)

℞ Sesquicarbonatis Ammoniæ, gr. v.; Misturæ Camphoræ, fʒvj.; Infusi Arnicæ, fʒij.; Essentiæ Anisi, min. xv. M. Fiat haustus, quâque secundâ horâ sumendus. (In adynamic febrile affections.)

℞ Ammoniæ Muriatis, gr. lx. ; Syrupi Hemidesmi, f℥ss. ; Aquæ Cinnamomi, f℥viiss. M. Fiat mistura cujus capiat cochlearia ampla duo sextis horis. (A useful mixture in adynamic fevers and in subacute laryngitis.)

℞ Olei Cajeputi, min. v.; Mucilaginis Tragacanthæ, fʒj.; Tere simul et adde, Infusi Caryophyllorum, f℥iss.; Tincturæ Ammoniæ compositæ, min. vj. M. Fiat haustus. (In hysterical and nervous affections.)

℞ Spiritus Ætherei Oleosi, fʒj.; Liquoris Muriatis Morphiæ, min. xv.; Aquæ Menthæ Piperitæ, fʒvj. M. Fiat haustus statim sumendus, et repetatur, si opus sit, quartâ parte horæ. (A powerful stimulating antispasmodic; very useful in spasm of the stomach and in spasmodic colic.)

℞ Tincturæ Arnicæ, f℥ss.; Infusi Acori, f℥viiss. M. Fiat mistura, cujus capiat unciam tertiis vel quartis horis. (In nervous head-ache and in old paralytic cases.)

℞ Calcis Chlorinatæ, ʒij.; Aquæ Destillatæ, Oj.; Solve et cola, dein adde, Mellis despumati, ℥j. Fiat gargarismus sæpè utendus, prius phiala concussa. (An exceedingly useful gargle in excessive mercurial salivation.)

℞ Calcis Chlorinatæ Liquoris, f℥xij.; Acidi Prussici, fʒj. Fiat lotio; Signetur, Poison. (An excellent application in chronic cutaneous diseases, when itching and tingling are very troublesome.)

℞ Camphoræ, rasæ et redactæ, ʒij.; Mucilaginis Gummi Arabici, fʒj.; Aquæ destillatæ, f℥vij. M. Fiat mistura, de quâ sumatur cochleare amplum quartis horis. (In cases of chronic bronchitis in the old and debilitated.)

℞ Camphoræ, rasæ et redactæ, ʒij.; Lactis recentis, f℥vj.; Aquæ Menthæ Pulegii, f℥ij. M. Fiat mistura, cujus capiat cochleare amplum quartâ quâque horá. (In the same cases as the above.)

℞ Camphoræ, rasæ et redactæ, gr. xij.; Sesquicarbonatis Ammoniæ, gr. ix.; Extracti Hyoscyami, gr. vj.; Mucilaginis, q. s. Fiat massula et divide in pilulas sex, quarum sumatur una bihorio. (In the advanced stages of typhoid and nervous fevers.)

℞ Cerevisiæ Fermenti; Misturæ Camphoræ, ana, f℥vj.; Tincturæ Arnicæ, fʒij. M. Fiat mistura, de quâ sumantur cochlearia tria ampla tertiis horis. (An excellent stimulant in the advanced stages of fevers when nervous symptoms predominate.)

℞ Muriatis Ammoniæ, gr. xx.; Pulveris Aromatici, gr. vj.; Theriacæ, q. s. ut fiat bolus. Capiat unum talem sextâ quâque horâ. (For uses, see page 369.)

℞ Potassii Sulphureti, gr. xl.; Aquæ destillatæ, f℥vj.; Syrupi Hemidesmi, f℥ij. M. Fiat mistura, cujus capiat cochleare amplum ter quaterve in die. (In some rebellious cutaneous diseases.)

℞ Tincturæ Sabadillæ, fʒj.; Tincturæ Camphoræ, f℥ij.; Essentiæ Rosmarini, f℥ss. M. Fiat embrocatio, cum panno laneo partibus dolentis applicanda. (In neuralgia and in muscular pains.)

℞ Liquoris Sodæ Chlorinatæ, fʒiiss. ; Infusi Serpentariæ, f℥vj. ; Syrupi Aurantii, f℥iss. M. Fiat mistura ; Capiat cochlearia ampla duo quartis horis. (In the advanced stages of typhoid fever.)

℞ Olei Terebinthinæ, f℥iiss. ; Mucilaginis Tragacanthæ, fʒss. ; Infusi Armoraciæ compositi, f℥v. M. Capiat cochleare amplum unum quâque secundâ horâ. (A useful stimulant in adynamic fevers.)

℞ Olei Terebinthinæ, fʒss. ; Adipis præparati, ℥iss. ; Olei Bergamotæ, min. xij. M. Fiat unguentum, mane nocteque applicandum. (In very chronic cases of eczema and herpes of the scalp.)

SPECIAL STIMULANTS.

℞ Arsenici Iodidi, gr. ij. ; Mannæ duræ, gr. xl. ; Mucilaginis, q. s. M. Fiat massula et divide in pilulas xx. quarum capiat unam ter de die. (In scaly diseases of the skin : the dose should be gradually increased, until one-fourth of a grain is taken three times a day.)

℞ Auri Iodidi, gr. j. ; Pulveris Gummi Arabici, gr. xxx. Misce intimè et divide in partes æquales quindecim, e quibus sumatur una ter in die. (In secondary syphilitic affections ; the dose should be gradually increased to one-tenth of a grain.)

℞ Auri Chloridi, gr. j. ; Extracti Alcoholici Aconiti, gr. vj. ; Pulveris Glycirrhizæ, ℈ij. ; Syrupi, q. s. Misce intimè et divide massulam in pilulas viginti, quarum sumatur una ter in die. (In secondary syphilitic affections attended with much pain.)

℞ Solutionis Ammoniæ Arseniatis, f℥j. ; Decocti Ulmi, f℥vij. M. Fiat mistura, cujus capiat cochlearia ampla duo quater in die. (In obstinate cutaneous affections, especially lepra and psoriasis.)

℞ Sodii Auro-terchloridi, gr. ij. ; Mannæ duræ, gr. l. Tere benè simul, et ope mucilaginis forma in pilulas viginti quatuor, è quibus sumatur una ter in die. (In syphilitic affections both primary and secondary.)

℞ Sodii Auro-terchloridi, gr. iv. Solve in aquæ destillatæ, q. s. ; Extracti Aconiti, gr. x. ; Extracti Dulcamaræ, ℥j. ; Althææ radicis, in pulvere, q. s. M. Divide in pilulas lxxx., quarum capiat unam ter in die. GRÖTZNER. (Said to be very efficacious in venereal skin diseases.)

℞ Sodii Auro-terchloridi, gr. ij. ; Aquæ destillatæ, f℥j. ; Syrupi Simplicis, fʒij. M. Fiat solutio, de quâ sumantur guttæ duodecim ter in die. (One of the best forms for administering the preparations of gold, as the dose can be apportioned with great accuracy.)

℞ Hydrargyri Bromidi, gr. ss.; Decocti Sarsaparillæ, f℥viij. M. Fiat mistura, capiat cochlearia duo ampla sextis horis. (In secondary syphilitic affections.)

℞ Copaibæ, fʒiij.; Solutionis Alkalinæ, (Brandish), fʒiss.; Tere benè simul in mortario vitreo, dein adde inter terendum, Olei Limonum, fʒss., et Syrupi Simplicis, fʒiij. Fiat mistura, capiat cochleare minimum ter in die ex cyatho aquæ. (This is an excellent form for administering copaiva.)

℞ Hydrargyri Iodidi viridis, gr. ij.; Hydrargyri cum creta, gr. xij.; Pulveris Aromatici, gr. ix. M. Divide in pulveres sex, quorum capiat unum omni mane. (An excellent alterative in the cutaneous eruptions of infancy and childhood. The above proportions are for a child two years old.)

℞ Hydrargyri Iodidi rubri, gr. j.; Extracti Gentianæ; Extracti Anthemidis, ana, ʒss. M. Divide in pilulas xij. Capiat unam mane nocteque. (Alterative and tonic.)

℞ Hydrargyri Iodidi rubri, gr. v.; Spiritus Vini Rectificati, fʒj.; tere simul, dein adde, Aquæ destillatæ, f℥j.; Iodidi Potassii, ʒij.; Syrupi Aurantii, f℥ss. M. Fiat solutio, cujus sumantur min. xx. ter in die. (In secondary syphilitic affections; every twenty minims contain about a tenth of a grain of iodide of mercury and about two grains of iodide of potassium; it may be taken in decoction of dulcamara, of elm bark, or of sarsaparilla.)

℞ Indigo (aquæ guttis nonnullis subacta), ʒij. to ℥ss.; Pulveris Aromatici, gr. xv. to gr. xxx.; Syrupi Simplicis, f℥ss. to f℥j. M. Fiat electuarium sumendum in die in portionibus divisis. (For uses, see page 450.)

℞ Iodinii, gr. iv.; Ætheris Sulphurici, fʒj. Solve. Capiat guttas decem ter in die. (Magendie's ethereal tincture of iodine.)

℞ Iodinii, gr. ij.; Iodidi potassii, gr. xvj.; Syrupi Florum Aurantii, f℥ij. M. Capiat cochleare minimum ter in die ex cyatho aquæ. (A convenient and agreeable form for administering iodine. Each fluid drachm contains an eighth of a grain of iodine and one grain of iodide of potassium.)

℞ Potassii Bromidi, gr. xx.; Aquæ Florum Aurantii, f℥iiss.; Syrupi Aurantii, f℥ss. M. Fiat mistura, cujus capiat partem quartam sextâ quâque horâ. (In chronic enlargements of the liver and spleen, and in secondary syphilitic affections.)

℞ Olei Morrhuæ, f℥iv.; Liquoris Potassæ Carbonatis, f℥ss.; Olei Limonum, fʒij.; Aquæ Carui, f℥iiss.; Essentiæ Carui, fʒij. M. Fiat mistura cujus sumantur cochlearia ampla duo ter in die. (In cases in which cod-liver oil is indicated.)

℞ Olei Morrhuæ; Mucilaginis Tragacanthæ, ana, f℥ij.; Aquæ Menthæ Piperitæ, f℥iv.; tere benè simul ut fiat mistura, cujus capiat cochlearia duo ampla ter in die. (This or the preceding formula may be prescribed for persons who have an insuperable disgust to the oil.)

℞ Olei Morrhuæ f℥ss. ; Liquoris Potassæ, fʒss. ; Adipis præparati, q. s. M. Fiat ungentum, sæpè utendum. (In scrofulous ulcerations, and in obstinate cutaneous diseases.)

℞ Tincturæ Nucis Vomicæ, fʒij. ; Tincturæ Cinchonæ, fʒvj. ; Infusi Cinchonæ, f℥vij. M. Fiat mistura cujus capiat unciam ter in die. (An excellent mixture in paralysis consequent on fevers and other acute diseases.)

℞ Strychniæ, gr. j. ; Acidi Sulphurici diluti, min. ij. ; Spiritus Vini Rectificati, fʒj.; Aquæ destillatæ, fʒxj. M. Fiat solutio, cujus capiat cochleare minimum ter in die. (Each fluid-drachm contains a twelfth of a grain of strychnia in the state of sulphate.)

℞ Strychniæ, gr. j. ; Acidi Acetici, min. iv. ; Spiritus Vini Rectificati, fʒj. M. Fiat solutio, cujus sumantur min. v. ter in die. (Every five minims contain a twelfth of a grain of strychnia in the state of acetate.)

℞ Strychniæ, fʒss. ; Olei Olivæ, f℥iss. M. (Ten drops to be rubbed over the temples three or four times a day in cases of amaurosis depending on paralysis of the optic nerve.)

℞ Potassii Bromidi, ʒss. ; Adipis præparati, ℥j. ; Brominei, min. vj. M. Fiat unguentum. (About the size of a walnut of this ointment should be rubbed over chronic glandular enlargements twice daily.)

TONICS.

℞ Acidi Phosphorici diluti, f℥ss. ; Infusi Calumbæ, f℥vij. Tincturæ Cardamomi compositæ, f℥ss. M. Fiat mistura, cujus capiat unciam ter in die. (In phosphatic deposits from the urine.)

℞ Argenti Nitratis, gr. ij. ; Fellis Bovini inspissati ; Extracti Anthemidis, ana, gr. xxx. M. Divide in pilulas duodecim, quarum sumatur una mane meridieque. (In chronic affections of the stomach accompanied by much pain, but without organic disease.)

℞ Argenti Chloridi, gr. xxxvj. ; Muriatis Quinæ, gr. xviij. ; Mannæ duræ, gr. viij. M. Fiat massula ope mucilaginis, et divide in pilulas duodecim, quarum capiat unam sextis horis. (An excellent tonic in the early stages of tubercular phthisis, and in dyspepsia occurring in debilitated habits.)

℞ Argenti Oxydi, gr. vj. ; Extracti Anthemidis, ʒj. M. Divide in pilulas xij. ; e quibus sumatur una ter in die. (In angina pectoris, epilepsy, chorea, &c.)

℞ Liquoris Potassii Iodidi compositi, f℥j.; Liquoris Arsenicalis, f℥j. M. Fiat mistura, cujus capiat min. x. ter in die e cyatho vinario misturæ sequentis.

℞ Decocti Dulcamaræ, f℥vij.; Syrupi Aurantii, f℥j. M. (This combination of iodine and arsenite of potash will be found very effectual in the treatment of chronic cutaneous affections of a scaly character.)

℞ Beeberinæ Sulphatis, gr. xvj.; Acidi Sulphurici diluti, min. x.; Aquæ destillatæ, f℥iiss.; Syrupi Florum Aurantii, f℥ss. M. Fiat mistura, cujus capiat cochlearia ampla duo, sextis horis. (In cephalalgia or neuralgic affections assuming a periodic character.)

℞ Bismuthi Subnitratis, gr. l.; Pilulæ Colocynthidis compositæ, ʒj.; Syrupi Zingiberis, q. s. M. Fiant pilulæ xxiv. quarum capiat duas mane meridieque. (In pyrosis with constipation.)

℞ Cetrarici Acidi, gr. xxiv.; Extracti Calumbæ, ʒss. M. Divide in pilulas xij. quarum sumatur una quartâ quâque horâ per dies duos, febre aggrediente. (An excellent febrifuge.)

℞ Tincturæ Chirettæ, f℥ss.; Liquoris Cinchonæ, fʒij.; Infusi Cascarillæ, f℥viss.; Syrupi Aurantii, fʒvj. M. Fiat mistura, capiat cochlearia ampla duo ter in die. (An excellent tonic mixture in convalescence from acute diseases.)

℞ Quinæ Muriatis, gr. xij.; Acidi Muriatici diluti, min. v.; Aquæ destillatæ, f℥vij.; Syrupi Florum Aurantii, f℥j. M. Fiat mistura, capiat cochlearia ampla duo ter in die. (A useful tonic mixture in chronic debility.)

℞ Quinæ *informis*, gr. ij.; Acidi Citrici, gr. j.; Syrupi Limonum, fʒj.; Aquæ destillatæ, fʒvij. M. Fiat haustus; capiat unum talem ter in die. (In general debility and in convalescence from acute disease.)

℞ Quinæ Arseniatis, octavem partem grani; Aquæ destillatæ, fʒvij.; Syrupi Florum Aurantii, fʒj. M. Fiat haustus: Capiat æger unum talem quartis horis per dies duos, febre aggrediente. (In tertian agues, when quina and arsenic separately fail to cure the disease.)

℞ Quinæ Valerianatis, gr. viij.; Infusi Cascarillæ, f℥iv. M. Fiat mistura cujus capiat semiunciam sextis horis. (An excellent remedy for hysterical and neuralgic affections occurring in debilitated habits.)

℞ Ferri Pulveris, gr. xxxvj.; Pilulæ Aloës cum Myrrhâ, ℥j.; Olei Juniperi, min. x. M. Fiat massula ope mucilaginis, et in pilulas viginti quatuor divide: Capiat duas ter de die. (An excellent form for admistering iron in chlorotic amenorrhœa.)

℞ Ferri Ammonio-tartratis, gr. xl.; Aquæ destillatæ, f℥vij.; Syrupi Hemidesmi, f℥j. M. Fiat mistura, cujus capiat cochlearia ampla duo ter in die. (A mild chalybeate tonic.)

℞ Ferri Bromidi, ʒj.; Syrupi Florum Aurantii, f℥ss.; Aquæ Florum Aurantii, f℥iss. M. Fiat solutio, cujus capiat cochleare minimum sextis horis ex cyatho infusi amari. (In secondary syphilitic diseases attended with debility, in anemic affections, &c.)

℞ Ferri Carbonatis Saccharati, fʒss.; Pulveris Myrrhæ, gr. xxiv.; Pulveris Aromatici, ʒss. M. Divide in partes æquales duodecim, quarum sumatur una ter in die. (An excellent combination in the protracted diarrhœas of infancy and childhood.)

℞ Ferri Ammonio-citratis, ʒj.; Aquæ Florum Aurantii, f℥viiss.; Syrupi Simplicis, f℥ss. M. Fiat mistura cujus capiat cochleare amplum quartis horis. (An agreeable form for administering a mild preparation of iron.)

℞ Ferri Iodidi, ʒss.; Croci, in pulvere, ʒij.; Sacchari puri, ℥iv. M. Fiant Trochisci, No. 120; sumantur sex usque ad decem quotidie; Pierquin. (An agreeable mode of administering the iodide of iron in amenorrhœa and chlorosis.)

℞ Ferri Phosphatis, gr. xxx.; Pulveris Myrrhæ, gr. xij.; Sacchari puri, gr. vj. M. Divide in pulveres sex, quorum sumatur unus mane meridieque. (In scrofulous diseases of the bones in children.)

℞ Ferri Valerianatis, gr. xij.; Olei Sabinæ, min. vj.; Mannæ duræ, quantum sufficit ut fiant pilulæ sex, quarum capiat unam ter in die. (In chorea and other nervous affections occurring in young girls about the age of puberty.)

℞ Salicin, gr. xvj.; Infusi Gentianæ compositi, f℥viiss.; Syrupi Hemidesmi, f℥ss. M. Capiat cochlearia ampla duo ter in die. (An excellent tonic in convalescence from acute diseases of the digestive organs.)

℞ Salicin, ℈ij.; Pulveris aromatici, ʒj. M. Divide in partes æquales duodecim, quarum capiat unam quartâ quâque horâ per dies duos, febre aggrediente. (An excellent substitute for disulphate of quina.)

APPENDIX B.

POSOLOGICAL TABLE.

The Doses in this table are those adapted for an adult, but the ordinary proportion, according to the age of the patient, may be regulated by the following rules:—The dose for an adult being 1, suppose ʒj.; under one year it will be from 1–16th to 1–12th, that is from gr. iv. to gr. v.: at two years old, 1–8th or gr. viij.: at three years old, 1–6th or gr. x.: at four years old, 1–4th or gr. xv.: at seven years old, 1–3rd or ℈j.: at fourteen years old, ½ or ʒss.: and at twenty years old 2–3rds or ℈ij.: and from twenty to sixty a full dose.

Absinthium	ʒss. to ʒj.
Acetum	fʒij. to f℥ss.
Colchici	fʒss. to fʒij.
Opii, D.	min. x. to min. xxx.
Opii, E.	min. viij. to min. xxv.
Scillæ	fʒss. to fʒiss.
Acidum Benzoïcum	gr. v. to gr. xxx.
Citricum	℈j. to ʒj.
Gallicum	gr. iij. to gr. x.
Hydrocyanicum dilutum	min. j. to min. ij.
Muriaticum dilutum	fʒss. to fʒj.
Nitricum dilutum	fʒss. to fʒj.
Nitro-muriaticum	gtt. x. to gtt. xx.
Oxalicum	gr. j. to gr. ij.
Phosphoricum dilutum	min. xx. to fʒj.
Succinicum	gr. v. to gr. viij.
Sulphuricum dilutum	min. x. to min. xl.
Sulphuricum aromaticum	min. xx. to min. xxx.
Tannicum	gr. ss. to gr. ij.
Tartaricum	gr. x. to ʒss.
Aconiti pulvis	gr. iij. to gr. xij.
Æther Aceticus	fʒss. to fʒij.
Sulphuricus	fʒss. to fʒij.
Allium	℥ss. to ℥j.
Aloë Hepatica, Socotrina, vel Indica	gr. iij. to gr. xv.

Aloë Barbadenis	gr. ij. to gr. v.
Alumen	gr. x. to ʒss.
Ammoniacum	gr. x. to ʒss.
Ammoniæ aqua	min. x. to min xxx.
arsenias	gr. 1-12th to gr. 1-10th.
bicarbonas	gr. v. to gr. xxx.
liquor	min. x. to min. xxx.
hydrosulphuretum	min. iv. to min. vj.
murias	gr. v. to gr. xxx.
sesqui-carbonas (Antacid)	gr. v. to gr. xx.
(Emetic)	gr. xxx. to gr. xl.
(Stimulant)	gr. v. to gr. xv.
Anethi fructus	gr. x. to ʒj.
Angelicæ fructus	ʒss. to ʒj.
radix	gr. x. to ʒss.
Anisi fructus	gr. x. to ʒss.
Anthemis nobilis	ʒss. to ʒij.
Antimonii oxydum	gr. iij. to gr. x.
pulvis compositus	gr. iij. to gr. x.
sulphuretum	gr. x. to ʒij.
præcipitatum	gr. j. to gr. iv.
Antimonium tartarizatum (Diaphoretic)	gr. 1-12 to gr. 1-6th
(Emetic)	gr. ij. to gr. v.
(Expectorant)	gr. 1-6th to gr. 1-10th.
(Sedative)	gr. j. to gr. iij.
Aqua Ammoniæ acetatis	f℥ss. to f℥ij.
carbonatis	min. xxx. to min. xl.
Anethi	f℥ss. to f℥iij.
Anisi	f℥ss. to f℥ij.
Calcis	f℥j. to f℥iv.
Camphoræ	f℥ss. to f℥j.
Carui	f℥j. to f℥iv.
Cassiæ	f℥j. to f℥iv.
Chalybeata	f℥j. to f℥ij.
Chlorinii	fʒss. to fʒij.
Cinnamomi	f℥j. to f℥iv.
Fœniculi	f℥j. to f℥iv.
Lauro-cerasi	fʒss. to fʒj.
Magnesiæ bicarbonatis	f℥ss. to f℥iij.
Menthæ piperitæ	f℥j. to f℥ij.
pulegii	f℥j. to f℥ij.
viridis	f℥j. to f℥ij.
Picis liquidæ	Oj. to Oij.
Pimentæ	f℥j. to f℥ij.
Potassæ	min. x. to fʒij.
effervescens	f℥ij. to f℥viij.
Sodæ effervescens	f℥vj. to f℥viij.
Argenti chloridum	gr. iij. to gr. v.
nitras	gr. 1-6th to gr. iij.

Argenti oxydum	gr. ss. to gr. j.
Arnicæ radix	gr. x. to gr. xx.
Arsenici iodidum	gr. 1-10th to gr. 1-4th.
Arsenicum album	gr. 1-16th to gr. 1-8th.
Assafœtida	gr. x. to ʒss.
Auri iodidum	gr. 1-15th to gr. 1-10th.
perchloridum	gr. 1-20th to gr. 1-15th.
peroxydum	gr. 1-10th to gr. 1-4th.
pulvis	gr. ¼th to gr. iij.

Balsamum Canadense	gr. xx. to ʒss.
Peruvianum	min. xx. to min. xl.
Tolutanum	gr. x. to gr. xxx.
Barii bromidum	gr. j. to gr. v.
chloridum	gr. ij. to gr. v.
Bebeerinæ sulphas	gr. j. to gr. v.
Belladonnæ folia	gr. ss. to gr. j.
radix	gr. ¼th to gr. ss.
Bismuthum album	gr. v. to ʒss.
Borax	gr. xx. to gr. xxx.
Brominei solutio	min. iij. to min. vj.
Buchu	℈j. to ʒss.
Black Drop	min. v. to min. viij.

Calamus aromaticus	gr. xx. to ʒj.
Calcii bromidum	gr. iij. to gr. x.
Calomelas (Alterative)	gr. j. to gr. iij.
(Antiphlogistic)	gr. iij. to gr. v.
(Cathartic)	gr. ij. to gr. vj.
Calumba	gr. x. to ʒss.
Calx chlorinata	gr. ij. to gr. v.
Cambogia	gr. ij. to gr. v.
Camphora	gr. v. to gr. x.
Canella	gr. x. to ʒss.
Cantharis	gr. ss. to gr. ij.
Capsicum	gr. ii. to gr. viij.
Cardamomi fructus	gr. v. to gr. xx.
Carrara water	f℥ij. to f℥vj.
Carui fructus	ʒj. to ʒij.
Caryophyllus aromaticus	gr. x. to ʒss.
Cascarilla	gr. x. to ℈ij.
Cassiæ cortex	gr. x. to ʒss.
Cassiæ pulpa	℥ss. to ℥iij.
Castoreum	ʒj. to ʒij.
Catechu	gr. x. to ʒj.
Cathartin	gr. j. to gr. iij.

Cerevisiæ fermentum	f℥ij. to f℥iij.
Cetrarin	gr. ij. to gr. v.
Chloroformum	min. v. to min. xxx.
Chiretta	gr. x. to gr. xx.
Cinchonæ cortex (Antiperiodic)	ʒj. to ʒij.
(Tonic)	gr. x. to ℈ij.
Cinchonia	gr. iij. to gr. v.
Cinnamomum	gr. x. to ʒss.
Colchici cormus	gr. ij. to gr. viij
semina	gr. ij. to gr. v.
Colocynthis	gr. ij. to gr. viij.
Confectio aromatica	gr xx. to ʒj.
Aurantii	ʒij. to ℥j.
Cassiæ	ʒij. to ℥j.
Catechu composita	ʒj. to ℥ss.
Opii	gr. x. to ʒj.
Piperis nigri	ʒj. to ʒij.
Rosæ	ʒj. to ʒij.
Scammonii	ʒss. to ʒj.
Sennæ	ʒij. to ℥ss.
Sulphuris	ʒij. to ℥ss.
Terebinthinæ	ʒij. to ℥iv.
Conia	gr. 1-50th to gr. 1-30th.
Conii folia	gr. v. to gr. x.
fructus	gr. iij. to gr. vj.
Conserva Aurantii	ʒij. to ℥j.
Rosæ	ʒj. to ʒij.
Contrajerva	℈j. to ℈ij.
Copaiba	min. x. to fʒj.
Coriandri fructus	ʒss. to ʒj.
Corrosivum sublimatum	gr. 1-12th to gr. 1-8th.
Cousso	ʒiv. to ʒvj.
Creasotum	min. j. to min. v.
Creta præparata	gr. x. to ʒij.
Crocus sativus	gr. xij. to ʒj.
Cubebæ pulvis	℈j. to ʒiij.
Cumini fructus	gr. x. to ʒss.
Cupri sulphas (Astringent and Tonic)	gr. ss. to gr. iij.
(Emetic)	gr. xij. to gr. xv.
Cuprum ammoniatum	gr. ss. to gr. v.
Cuspariæ cortex	gr. x. to ʒss.

Decoctum Aloes compositum	f℥ss. to f℥ij.
Althææ	f℥j. to f℥ij.
Cetrariæ	f℥j. to f℥iv.
Chimaphilæ	f℥j. to f℥ij.
Cinchonæ	f℥j. to f℥ij.

Decoctum Colocynthidis	fʒij. to f℥ss.
Dulcamaræ	f℥j. to f℥ij.
Ergotæ	fʒss. to f℥j.
Gallæ	f℥ss. to f℥ij.
Granati	f℥ss. to f℥j.
radicis	f℥iv. to f℥viij.
Guaiaci	f℥ij. to f℥iv.
Hæmatoxyli	f℥j. to f℥ij.
Lichenis islandici	f℥j. to f℥ij.
Lini compositum	f℥ij to f℥iv.
Mezerei	f℥iv. to f℥v.
Myrrhæ	f℥ss. to f℥j.
Pareiræ	f℥j. to f℥iij.
Pyrolæ	f℥j. to f℥ij.
Quercus	f℥j. to f℥iv.
Sarsaparillæ	f℥iv. to f℥viij.
compositum	f℥iv. to f℥vj.
Senegæ	f℥ij. to f℥iij.
Scoparii	f℥j. to f℥iv.
Taraxaci	f℥j. to f℥ij.
Tormentillæ	f℥j. to f℥iss.
Ulmi	f℥ij. to f℥vj.
Uvæ-ursi	f℥j. to f℥iij.
Delphinia	gr. 1-12th to gr. 1-4th.
Digitaline	gr. 1-12th to gr. 1-10th.
Digitalis (Diuretic)	gr. ss. to gr. j.
(Sedative)	gr. j. to gr. iij.
Elaterina	gr. 1-20th to gr. 1-10th.
Elaterium	gr. 1-16th to gr. 1-4th.
Electuarium aromaticum	gr. x. to gr. xl.
Catechu	℈j. to ʒij.
Opii	gr. x. to ʒj.
Sennæ	ʒij. to ℥ss.
Emetina, *pure*	gr. $\frac{1}{8}$ to gr. ss.
impure	gr. ss. to gr. iij.
Ergota	℈j. to ʒj.
Ergotin	gr. v. to gr. x.
Essentia Anisi	min. xx. to min. xl.
Carui	fʒj. to fʒij.
Cinnamomi	min. xx. to min. xxx.
Fœniculi	min. xx. to min. xxx.
Menthæ piperitæ	min. xx. to fʒj.
pulegii	min. xx. to fʒj.
viridis	min. xx. to fʒj.
Myristicæ moschatæ	min. xx. to fʒj.
Pimentæ	min. xxx. to fʒj.

Essentia Rosmarini	min. x. to f℥ss.
Zingiberis	min. xx. to min. xl.
Extractum Aconiti	gr. 1-6th to gr. 1-3rd.
alcoholicum	gr. ij. to gr. viij.
Aloës aquosum	gr. v. to gr. xv.
Anthemidis	gr. x. to ʒss.
Belladonnæ	gr. ss. to gr. iv.
Calumbæ	gr. v. to gr. xx.
Cannabis	gr. 2-3rd to gr. v.
Cinchonæ	gr. v. to gr. xx.
Colchici	gr. j. to gr. iij.
aceticum	gr. j. to gr. iij.
Colocynthidis	gr. v. to gr. xv.
Conii	gr. iij. to gr. v.
Cotyledon	ʒss. to ʒj.
Digitalis	gr. ss. to gr. j.
Filicis	gr. xviij. to gr. xxiv.
Fuliginis	gr. v. to gr. x.
Gentianæ	gr. x. to ʒss.
Hæmatoxyli	gr. x. to gr. xxx.
Hyoscyami	gr. v. to gr. xv.
Jalapæ, L.	gr. x. to ℈j.
Jalapæ, E.	gr. iij. to gr. x.
Krameriæ	gr. xx. to gr. xl.
Lactucæ	℈j. to ʒj.
Lupuli	gr. v. to gr. xx.
Menyanthis	gr. x. to gr. xx.
Nucis-vomicæ	gr. ss. to gr. iij.
Opii aquosum	gr. ss. to gr. iv.
Papaveris	gr. ij. to gr. xx.
Pareiræ	gr. x. to ʒss.
Quassiæ	gr. v. to gr. xv.
Rhei	gr. x. to ʒss.
Sabadillæ	gr. $\frac{1}{8}$ to gr. $\frac{1}{4}$.
Sarsaparillæ fluidum	f℥ss. to f℥j.
Scammonii	gr. ij. to gr. v.
Sennæ fluidum	fʒj. to fʒij.
Stramonii	gr. $\frac{1}{4}$ to gr. ss.
Taraxaci	gr. x. to ʒss.
Uvæ ursi	gr. v. to gr. xv.

Fel Bovinum inspissatum	gr. v. to gr. x.
Ferri acetatis tinctura	min. xxx. to fʒj.
ammonio-chloridum	gr. v. to gr. xv.
ammonio-citras	gr. v. to gr. viij.
ammonio-tartras	gr. v. to gr. viij.
arsenias	gr. 1-12th to gr. 1-8th.
bromidum	gr. iij. to gr. viij.

Ferri carbonas	ʒss. to ʒiv.
saccharatum	gr. v. to gr. xxx.
et magnesiæ citras	gr. ij. to gr. x.
et manganesiæ carbonas saccharatum	gr. v. to ℈j.
et quinæ citras	gr. iij. to gr. vj.
iodidum	gr. ij. to gr. v.
lactas	gr. vj. to gr. xij.
oxydum magneticum	gr. v. to gr. xx.
rubrum	ʒss. to ʒiv.
percyanidum	gr. iij. to gr. vj.
pernitratis liquor	fʒss. to fʒj.
peroxydum	ʒss. to ʒiv.
phosphas	gr. v. to gr. x.
pulvis	gr. j. to gr. x.
sulphas	gr. j. to gr. v.
saccharatum	gr. j. to gr. viij.
siccatum	gr. ss. to gr. iij.
valerianas	gr. ss. to gr. j.
Ferrum tartarizatum	gr. v. to gr. xx.
Filix	ʒj. to ʒiij.
Fœniculi fructus	ʒss. to ʒj.
Galbanum	gr. x. to gr. xx.
Gallæ	gr. v. to ℈j.
Gentiana	gr. x. to gr. xxx.
Gigartina helminthocorton	gr. x. to ʒij.
Granatum	ʒss. to ʒj.
Guaiaci resina	gr. x. to ʒss.
Helleborus	gr. iij. to gr. xij.
Hydrargyri bicyanidum	gr. 1-12th to gr. 1-8th.
bromidum	gr. 1-16th to gr. 1-4th.
iodidum rubrum	gr. 1-16th to gr. 1-8th.
viride	gr. j. to gr. iij.
iodo-chloridum	gr. 1-16th to gr. 1-12th.
oxydum rubrum	gr. ¼ to gr. ss.
sub-bromidum	gr. j. to gr. ij.
Hydrargyrum cum cretâ	gr. x. to ʒss.
magnesiâ	gr. x. to ʒss.
Hyoscyami folia	gr. v. to gr. x.
semina	gr. iij. to gr. viij.
Indigo	gr. v. to gr. x.
Infusum Absinthii	f℥j. to f℥ij.
Allii	f℥ij. to f℥iij.

Infusum Anthemidis	f℥j. to f℥ij.
Armoraciæ compositum	f℥j. to f℥ij.
Arnicæ	fʒij. to f℥ss.
Aurantii compositum	f℥j. to f℥ij.
Buchu	f℥j. to f℥ij.
Calami aromatici	f℥j. to f℥ij.
Calumbæ	f℥j. to f℥iij.
Caryophylli	f℥j. to f℥ij.
Cascarillæ	f℥j. to f℥ij.
Catechu compositum	f℥j. to f℥ij.
Centaurei	f℥j. to f℥ij.
Chirettæ	f℥j. to f℥ij.
Cinchonæ	f℥j. to f℥iij.
spissatum	min. xx. to fʒj.
Cuspariæ	f℥j. to f℥ij.
Digitalis (Diuretic)	fʒij. to f℥ss.
(Sedative)	f℥j. to f℥ij.
Ergotæ	fʒss. to f℥ij.
Gallæ	f℥ss. to f℥ij.
Gentianæ compositum	f℥j. to f℥ij.
Gigartinæ	fʒij. to f℥ss.
Granati radicis	f℥iv. to f℥viij.
Hemidesmi	f℥j. to f℥ij.
Juniperi	f℥ij. to f℥iij.
Krameriæ	f℥j. to f℥ij.
Lauri nobilis	f℥ss. to f℥ij.
Lini	f℥ij. to f℥iv.
Lupuli	f℥j. to f℥ij.
Marrubii	f℥iij. to f℥iv.
Matico	f℥j. to f℥ij.
Melissæ	f℥ij. to f℥iv.
Menthæ	f℥j. to f℥ij.
Menyanthis	f℥j. to f℥iv.
Pareiræ	f℥j. to f℥iv.
Polygalæ	f℥ij. to f℥iij.
Quassiæ	f℥j. to f℥ij.
Rhei	f℥ss. to f℥ij.
Rutæ	f℥j. to f℥ij.
Rosæ acidum	f℥ss. to f℥ij.
Sabinæ	f℥ss. to f℥j.
Sassafras	f℥j. to f℥ij.
Scoparii	f℥j. to f℥ij.
Senegæ	f℥ij. to f℥iij.
Sennæ compositum	f℥ij. to f℥iv.
Serpentariæ	f℥j. to f℥ij.
Simarubæ	f℥j. to f℥ij.
Spigeliæ	f℥ss. to f℥j.
Sumbul	f℥ss. to f℥j.
Valerianæ	f℥j. to f℥ij.

Inula helenium	℈j. to ʒij.
Ipecacuanha (Emetic)	gr. xij. to gr. xx.
(Expectorant)	gr. ¼ to gr. ij.
Jalapa	gr. x. to gr. xxx.
Jelly of Bark	ʒj. to ʒij.
Corsican Moss	ʒj. to ʒij.
Kino	gr. x. to ʒss.
Kousso	ʒiv. to ʒvj.
Krameria	gr. x. to ʒss.
Lactucarium	gr. v. to gr. xx.
Linum catharticum	ʒj. to ʒiss.
Liquor Ammoniæ	min. x. to min. xxx.
acetatis	f℥ss. to f℥ij.
citratis	fʒij. to f℥j.
sesqui-carbonatis	min. xxx. to min. lx.
Antimonii tartarizati	min. xx. to min. xxx.
Arsenicalis	min. v. to min. viij.
Arsenici chloridi	min. iij. to min. x.
Arsenici et Hydrargyri hydriodatis	min. x. to min. xxx.
Barii chloridi	min. v. to min. x.
Calcii chloridi	min. xxx. to fʒij.
Calcis	f℥j. to f℥iv.
Chlorinii	fʒss. to fʒij.
Cinchonæ	min. xx. to fʒss.
Ferri pernitratis	fʒss. to fʒj.
Hydrargyri bichloridi	fʒss. to fʒij.
Iodinei compositus	min. v. to min. xv.
Morphiæ acetas, D.	min. xx. to min. xl.
acetatis, L.	min. x. to min. xx.
muriatis, D. E.	min. xx. to min. xl.
muriatis, L.	min. x. to min. xx.
Opii sedativus	min. xv. to min. xxx.
Potassæ	min. x. to fʒij.
carbonatis	min. x. to fʒj.
effervescens	f℥ij. to f℥viij.
Potassii iodidi compositus	fʒj. to f℥ss.
Sodæ carbonatis	f℥ss. to f℥j.
chlorinatæ	min. xx. to min. xxx.
effervescens	f℥vj. to f℥viij.
Taraxaci	min. x. to min. xl.

Liquor Tartari emetici	min. xx. to min. xxx.
Lobelia	gr. j. to g. v.
Lupulina	gr. vj. to gr. xij.

Magnesia (Antacid)	gr. x. to gr. xxx.
(Cathartic)	℈j. to ʒj.
Magnesiæ carbonas (Antacid)	gr. xv. to ʒss.
(Cathartic)	ʒj. to ʒij.
sulphas	ʒij. to ℥j.
Manganesiæ sulphas	ʒj. to ʒvj.
Manna	℥j. to ℥ij.
Mannite	℥ss. to ℥j.
Matico	gr. x. to ʒss.
Mel Rosæ	ʒij. to ʒiv.
Violæ	ʒj. to ℥ss.
Menyanthes	gr. x. to ʒss.
Mistura Althææ	f℥j. to f℥ij.
Ammoniaci	f℥ss. to f℥j.
Amygdalæ	f℥j. to f℥ij.
Camphoræ	f℥j. to f℥ij.
cum Magnesiâ	f℥ss. to f℥j.
Cascarillæ composita	f℥j. to f℥iss.
Creasoti	f℥j. to f℥ij.
Cretæ	f℥j. to f℥ij.
Ferri aromatica	f℥j. to f℥ij.
composita	f℥j. to f℥ij.
Gentianæ composita	f℥j. to f℥ij.
Guaiaci	f℥ss. to f℥ij.
Monesiæ	f℥ss. to f℥ij.
Scammonii	f℥ss. to f℥iss.
Spiritus Vini Gallici	f℥ss. to f℥iss.
Monesia	gr. v. to gr. xv.
Morphia	gr. ¼ to gr. ss.
Morphiæ acetas	gr. ¼ to gr. ss.
murias	gr. ¼ to gr. ss.
sulphas	gr. ¼ to gr. ss.
Moschus	gr. x. to gr. xx.
Mucuna	ʒj. to ℥ss.
Myristica	gr. x. to gr. xxx.
Myrrha	gr. x. to gr. xxx.

Nux-vomica	gr. v. to gr. xx.

Oleum Amygdalæ amaræ	min. ¼ to min. ss.
Anethi	min. j. to min. v.
Anisi	min. ij. to min. viij.

Oleum Anthemidis	min. iij. to min. viij.
Cajeputi	min. v. to min. x.
Carui	min. j. to min. x.
Caryophylli	min. ij. to min. viij.
Cassiæ	min. ij. to min. v.
Cinnamomi	min. j. to min. v.
Copaibæ	min. xv. to min. xxx.
Crotonis	min. j. to min. ij.
Cubebæ	min. x. to min. xxx.
Euphorbiæ lathyris	min. iv. to min. viij.
Fœniculi	min. ij. to min. x.
Juniperi	min. iij. to min. v.
Lavandulæ	min. ij. to min. v.
Limonum	min. ij. to min. v.
Menthæ piperitæ	min. ij. to min. v.
pulegii	min. ij. to min. v.
viridis	min. ij. to min. v.
Morrhuæ	f℥ss. to f℥ij.
Myristicæ	min. j. to min. v.
Olivæ	f℥j. to f℥ij.
Origani	min. j. to min. iij.
Pimentæ	min. ij. to min. v.
Ricini	f℥ss. to f℥ij.
Rosmarini	min. ij. to min. v.
Rutæ	min. ij. to min. v.
Sabinæ	min. ij. to min. vj.
Sassafras	min. ij. to min. x.
Succini	min. v. to min. x.
Terebinthinæ (Anthelmintic)	f℥ss. to f℥ij.
(Cathartic)	fʒij. to f℥ij.
(Diuretic)	min. x. to min. xxx.
(Stimulant)	min. x. to min. xx.
Opium	gr. ss. to gr. iv.
Oxymel	fʒj. to f℥j.
Scillæ (Emetic)	f℥j. to f℥ij.
(Expectorant)	min. x. to min. xxx.
Pareira	ʒss. to ʒj.
Pepsina	gr. x. to gr. xx.
Petroleum	fʒvj. to f℥j.
Pilulæ Aloës	gr. v. to gr. xv.
compositæ	gr. v. to gr. xv.
cum myrrhâ	gr. x. to gr. xx.
cum sapone	gr. v. to gr. xv.
et Assafœtidæ	gr. x. to gr. xv.
et Ferri	No. 1 to 3.
ante cibum	No. 1 to 2.
Asiaticæ	No. 1 to 2.

Pilulæ Assafœtidæ compositæ	gr. x. to ℈j.
Calomelanos compositæ	gr. v. to gr. xv.
Calomelanos et Opii	No. 1 to 2.
Catharticæ compositæ	No. 1 to 2.
Cambogiæ compositæ	gr. x. to gr. xx.
Colocynthidis compositæ	gr. v. to gr. xv.
et Hyoscyami	No. 1 to 3.
Conii compositæ	gr. v. to gr. x.
Corrosivi sublimati	No. 1 to 4.
Cupri ammoniati	No. 1 to 5.
Digitalis et Scillæ	gr. iij. to gr. v.
Ferri bromidi	No. 1 to 2.
carbonatis	No. 1 to 4.
compositæ	gr. x. to gr. xx.
iodidi	No. 1 to 3.
sulphatis	gr. v. to gr. xv.
Galbani compositæ	gr. x. to ℈j.
Hydrargyri (Alterative)	gr. iij. to gr. v.
(Cathartic)	gr. xij. to gr. xx.
Iodidi	gr. v. to gr. xv.
Ipecacuanhæ cum Scillâ	gr. v. to gr. xx.
et Opii	gr. iv. to gr. viij.
Opii *sive* Thebaicæ	No. 1 to 3.
Plumbi Opiatæ	gr. viij. to gr. xij.
Quinæ sulphatis	No. 2 to 5.
Rhei	gr. v. to gr. xv.
compositæ	gr. v. to ℈j.
et Ferri	gr. x. to gr. xv.
Saponis compositæ	gr. iij. to gr. x.
Scillæ compositæ	gr. v. to gr. xv.
Styracis compositæ	gr. iij. to gr. x.
Pimenta	ʒss. to ʒj.
Piper longum	gr. v. to ℈j.
Piper nigrum	gr. v. to gr. xx.
Piperin	gr. iij. to gr. v.
Plumbi acetas	gr. ij. to gr. viij.
iodidum	gr. iij. to gr. v.
Potassæ acetas (Cathartic)	ʒij. to ʒiij.
(Diuretic)	gr. x. to gr. xx.
aqua	min. x. to min. xl.
effervescens	f℥ij. to f℥viij.
bicarbonas	gr. x. to gr. xxx.
bisulphas	ʒss. to ʒiss.
bitartras (Cathartic)	ʒiij. to ʒvj.
(Diuretic)	gr. xx. to ʒj.
carbonas	gr. v. to gr. xx.
chloras	gr. x. to gr. xx.
liquor	min. x. to fʒij.
nitras (Diuretic)	gr. xxx. to gr. xl.

Potassæ nitras (Refrigerant)	gr. x. to ʒj.
sulphas	ʒj. to ʒiv.
cum sulphure	ʒss. to ʒj.
tartras	ʒij. to ʒx.
Potassii bromidum	gr. iij. to gr. xij.
cyanidum	gr. $\frac{1}{8}$ to gr. $\frac{1}{4}$.
iodidum	gr. iij. to gr. xv.
sulphuretum	gr. iij. to gr. x.
Pulvis Aloës compositus	gr. x. to ℈j.
Aluminis compositus	gr. xij. to ℈ij.
Antimonialis	gr. iij. to gr. x.
Aromaticus	gr. v. to gr. xx.
Auri	gr. $\frac{1}{4}$ to gr. iij.
Catechu compositus	ʒss. to ʒij.
Cinnamomi compositus	gr. v. to gr. xx.
Cretæ compositus	gr. x. to gr. xxx.
cum Opio	gr. xx. to gr. xl.
Elaterii compositus	gr. v. to gr. x.
Ferri	gr. j. to gr. x.
Gallæ	gr. v. to ℈j.
Ipecacuanhæ compositus	gr. v. to gr. xx.
Jalapæ compositus	ʒss. to ʒiss.
Kino compositus	gr. x. to gr. xxx.
Lobeliæ	gr. j. to gr. v.
Rhei (Stomachic)	gr. v. to gr. x.
(Cathartic)	℈j. to ℈ij.
compositus	ʒss. to ʒj.
Salinus compositus	ʒij. to ℥ss.
Scammonii compositus	gr. x. to gr. xx.
Stanni	℥ss. to ℥j.
Tragacanthæ compositus	ʒj. to ʒij.
Punica granatum, radicis cortex	℥ss. to ℥ij.

Quassia	gr. xv. to gr. xxx.
Quercûs cortex	ʒss. to ʒj.
Quina	gr. iij. to gr. v.
amorphous	gr. iij. to gr. v.
Quinæ acetas	gr. j. to gr. v.
arsenias	gr. 1-10th to gr. 1-4th.
citras	gr. j. to gr. v.
disulphas	gr. j. to gr. v.
murias	gr. j. to gr. v.
nitras	gr. j. to gr. v.
phosphas	gr. j. to gr. v.
sulphas	gr. iij. to gr. v.
tannas	gr. j. to gr. v.
tartras	gr. j. to gr. v.
valerianas	gr. ss. to gr. ij.

Quinidina	gr. iij. to gr. v.

Resina Copaibæ	gr. x. to ʒss.
Jalapæ	gr. iij. to gr. x.
Scammonii	gr. ij. to gr. v.
Rhamni baccæ	No. 10 to 20.
Rheum	℈j. to ℈ij.

Sabadilla	gr. j. to gr. viij.
Sabina	gr. v. to gr. xv.
Sagapenum	gr. v. to gr. xx.
Salicin (Febrifuge)	℈j. to ℈ij.
(Tonic)	gr. ij. to gr. v.
Salix	ʒss. to ʒj.
Santonine (brown)	gr. v. to gr. x.
(pure)	gr. j. to gr. ij.
Sapo Crotonis	gr. j. to gr. iij.
Jalapinus	gr. xij. to ℈j.
Sarsaparilla	ʒj. to ʒij.
Scammonium	gr. viij. to gr. x.
Scilla (Emetic)	gr. viij. to gr. xij.
(Expectorant)	gr. j. to gr. iss.
Diuretic	gr. j. to gr. iij.
Scoparin	gr. v. to gr. vj.
Senega	gr. x. to ʒss.
Sennæ folia	ʒij. to ℥ss.
Serpentariæ radix	gr. x. to ʒss.
Sinapis (Emetic)	℥ss. to ℥j.
alba	ʒj. to ʒij.
Sodæ acetas	gr. x. to gr. xx.
arsenias	gr. 1-12th to gr. 1-8th.
biboras	gr. x. to gr. xxx.
bicarbonas	gr. x. to ʒss.
carbonas	gr. x. to ʒss.
siccatum	gr. v. to gr. xx.
et potassæ tartras	ʒij. to ℥j.
hyposulphis	ʒj. to ʒij.
murias	gr. x. to ʒj.
phosphas	ʒiv. to ʒxij.
sulphas	ʒv. to ʒx.
Sodii auro-terchloridum	gr. 1-20th to gr. 1-15th
iodidum	gr. ij. to gr. xv.
Solutio alkalina *(Brandish)*	fʒss. to f℥ij.
Elaterinæ	min. xxx. to min. xl.
Morphiæ muriatis	min. xx. to min. xl.
Spigelia	gr. xx. to gr. xl.

Spiritus Ætherus nitrosus	fʒss. to fʒiij.
oleosus	fʒss. to fʒij.
Ætheris sulphurici	fʒj. to fʒiij.
compositus	fʒss. to fʒij.
Ammoniæ	fʒss. to fʒiss.
aromaticus	min. xxx. to fʒj.
fœtidus	fʒj. to fʒss.
Anisi	fʒss. to fʒj.
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Carui	fʒj. to fʒij.
Cassiæ	fʒss. to f℥j.
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Juniperi compositus	fʒij. to fʒiv.
Lavandulæ	min. xxx. to fʒij.
Menthæ piperitæ	fʒss. to fʒj.
pulegii	fʒss. to fʒj.
viridis	fʒss. to fʒj.
Myristicæ	fʒj. to fʒiv.
Pimentæ	fʒj. to fʒij.
Pyroxilicus	min. v. to min. xx.
Rosmarini	min. x. to min. xxx.
Stanni pulvis	℥ss. to ℥j.
Stramonii folia	gr. j. to gr. iv.
semina	gr. ¼ to gr. j.
Strychnia	gr. 1-12th to gr. 1-8th.
Strychniæ murias	gr. 1-12th to gr. 1-8th.
Sulphur (Cathartic)	ʒiij. to ʒiv.
(Stimulant)	gr. x. to gr. xxx.
iodatum	gr. j. to gr. iij.
præcipitatum	ʒiij. to ʒiv.
Succus Belladonnæ	min. xx. to min. xl.
Colchici	min. v. to min. xx.
Conii	min. xxx. to fʒj.
Cotyledon	fʒvj. to f℥j.
Digitalis	fʒj. to fʒij.
Hyoscyami	min. xx. to min. xl.
Limonum	f℥j. to f℥iv.
Syrupus Aceti	fʒij. to f℥j.
Acidi citrici	fʒij. to f℥j.
Allii	f℥ss. to f℥j.
Althææ	f℥ss. to f℥j.
Aurantii	fʒij. to f℥ss.
Cinchonæ	fʒj. to f℥ss.
Croci	fʒij. to f℥ss.
Ferri iodidi	min. xv. to min. lx.
Ferri lactatis	fʒij. to f℥ss.
Guaiaci	fʒj. to fʒij.

Syrupus Hemidesmi	f℥j. to f℥ij.
Ipecuanhæ (Emetic)	f℥j. to f℥ij.
(Expectorant)	fʒj. to fʒij.
Limonum	f℥j. to f℥ij.
Mori	fʒj. to f℥ij.
Morphiæ acetatis	f℥ss. to f℥iss.
muriatis	f℥ss. to f℥iss.
Papaveris	f℥ss. to f℥j.
Potassii cyanidi	fʒij. to fʒvj.
Rhamni	f℥ss. to f℥j.
Rhei	f℥ss. to f℥j.
Rhœados	f℥ss. to f℥j.
Rosæ gallicæ	f℥ss. to f℥j.
Rutæ	f℥ss. to f℥ij.
Sarzæ	fʒiv. to fʒvj.
Scillæ (Emetic)	f℥j. to f℥ij.
(Expectorant)	min. x. to min. xxx.
compositus	fʒj. to fʒij.
Sennæ	f℥ss. to fʒj.
Tolutanus	fʒij. to f℥ss.
Ulmi	fʒij. to f℥ss.
Violæ	fʒj. to fʒiv.
Zingiberis	fʒj. to f℥ss.

Tamarindus	℥ss. to ℥iss.
Tannin	gr. ss. to gr. ij.
Terebinthina Canadensis	gr. x. to gr. xxx.
Chia	gr. x. to gr. xxx.
Tinctura Absinthii	fʒij. to f℥ss.
Aconiti, D. L.	min. v. to min. x.
(Fleming)	min. iij. to min. v.
Aloes	min. xxx. to f℥ss.
composita	fʒss. to fʒij.
Ammoniæ composita	min. v. to min. x.
Arnicæ	fʒss. to fʒij.
Assafœtidæ	fʒss. to fʒiij.
Aurantii	fʒj. to fʒiij.
Belladonnæ foliorum	min. iij. to min. viij.
Benzoïni composita	fʒss. to fʒij.
Buchu	fʒj. to fʒiij.
Calumbæ	fʒj. to fʒij.
Camphoræ composita	fʒj. to fʒiij.
Cannabis indicæ	min. xx. to fʒj.
ætherea	min. x. to min. xx.
Cantharidis	min. x. to min. xl.
Capsici	min. xx. to fʒj.
Cardamomi	fʒj. to fʒij.

Tinctura Cardamomi composita	fʒj. to fʒij.
Cascarillæ	fʒj. to f℥ss.
Cassiæ	fʒj. to fʒij.
Castorei	fʒij. to fʒiv.
composita	fʒj. to fʒij.
Catechu	fʒj. to fʒij.
Chirettæ	fʒj. to fʒij.
Cinchonæ	fʒj. to fʒiij.
composita	fʒj. to f℥ss.
Cinnamomi	fʒj. to f℥ss.
composita	fʒj. to fʒij.
Cocci cacti	fʒj. to fʒij.
Colchici	fʒj. to fʒij.
composita	min. xx. to min xxx.
Colocynthidis	min. x. to min. xv.
Conii	min. xx. to min. xl.
Croci	fʒj. to fʒij.
Cubebæ	fʒj. to fʒij.
Cuspariæ	fʒj. to fʒij.
Digitalis (Diuretic)	min. xx. to min. xxx.
(Sedative)	fʒss. to fʒiss.
Elaterii	fʒss. to fʒij.
Ergotæ	min. x. to fʒj.
etherea	min. x. to fʒj.
Ferri acetatis	min. xxx. to fʒj.
ammonio-chloridi	min. xij. to min. xl.
aurantiacea	fʒj. to fʒiv.
sesquichloridi	min. x. to fʒss.
Fuliginis	fʒj. to fʒij.
Gallæ	fʒss. to fʒij.
Gambogiæ	fʒss. to fʒj.
Gentianæ composita	fʒj. to fʒij.
Guaiaci	fʒj. to f℥ss.
ammoniata	fʒj. to fʒij.
Hellebori	fʒj. to fʒij.
Hyoscyami	fʒss. to fʒij.
Iodinii	min. v. to min. xx.
composita	min. x. to min. xxx.
Jalapæ	fʒj. to fʒiv.
Kino	fʒj. to fʒij.
Krameriæ	fʒiss. to fʒij.
Lactucarii	fʒj. to fʒij.
Lavandulæ composita	min. xxx. to fʒij.
Limonis	fʒss. to fʒij.
Lobeliæ	fʒss. to fʒj.
ætherea	min. xx. to min. xl.
Lupuli	fʒss. to fʒij.
Lupulinæ	fʒss. to fʒij.
Matico	fʒj. to fʒij.

Tinctura Monesiæ	fʒj. to fʒij.
Myrrhæ	fʒj. to fʒij.
Nucis vomicæ	min. x. to min. xxx.
Opii	min. x. to min. xxx.
Opii ammoniata	fʒiss. to fʒij.
camphorata	fʒj. to fʒiij.
Quassiæ	fʒj. to fʒij.
composita	fʒj. to f℥ss.
Quinæ composita	fʒj. to f℥ss.
Rhei	fʒj. to fʒiij.
composita	fʒj. to fʒiij.
et Aloës	f℥ss. to f℥j.
et Gentianæ	fʒj. to fʒij.
Scillæ	min. x. to min. xxx.
Sennæ composita	fʒij. to f℥j.
Serpentariæ	fʒj. to fʒij.
Stramonii	min. x. to min. xxx.
Sumbul	fʒj. to fʒij.
Tolutana	fʒj. to fʒij.
Toxicodendri	fʒss. to fʒj.
Valerianæ	fʒij. to fʒiv.
ammoniata	fʒj. to fʒij.
composita	fʒj. to fʒij.
Veratriæ	min. v. to min. xv.
Zingiberis, D.	min. xx. to fʒj.
Zingiberis, L.	fʒj. to fʒij.
Tormentilla	ʒss. to ʒj.
Toxicodendron	gr. j. to gr. v.
Tragacantha	ʒss. to ʒij.
Trochisci Cretæ	ʒj. to ʒij.
Ferri lactatis	No. 6 to 18. (*Daily*)
Lactucarii	℈j. to ℈ij.
Magnesiæ	ʒj. to ʒij.
Morphiæ	No. 10 to 12. (*Daily*)
et Ipecacuanhæ	No. 10 to 12. (*Daily*)
Opii	No. 10 to 12. (*Daily*)
Sodæ bicarbonatis	ʒj. to ʒij.

Uva-ursi	gr. xx. to ʒj.
Urea	gr. x. to gr. xx.

Valeriana	ʒss. to ʒj
Veratria	gr. 1-12th to gr. 1-10th.
Veratrum	gr. ij. to gr. v.
Vinum	f℥viij. to f℥xx.

Vinum Aloës	f℥ss. to f℥j.
Antimoniale	min. xx. to min. xxx.
Colchici	fʒss. to fʒij.
Ferri	fʒj. to f℥ss.
Gentianæ compositum	f℥ss. to f℥j.
Ipecacuanhæ (Emetic)	fʒij. to fʒiv.
(Expectorant)	min. x. to min. xl.
Opii	min. x. to f℥ss.
Quinæ	f℥ss. to f℥j.
Rhei	fʒij. to f℥j.
Scillæ	fʒj. to fʒiij.
Tabaci	min. x. to min. xl.
Veratri	min. v. to min. x.
Violæ radix (Emetic)	ʒss. to ʒj.

Zinci acetas	gr. j. to gr. iij.
cyanidum	gr. ¼ to gr. ½.
oxydum	gr. j. to gr. ij.
sulphas	gr. j. to gr. v.
(Emetic)	gr. xv. to gr. xxx.
valerianas	gr. ¾ to gr. j.
Zingiber	gr. v. to gr. xxx.

APPENDIX C.

TABLE OF WEIGHTS AND MEASURES.*

According to the ordinance contained in the last edition of the Dublin Pharmacopœia (1850), prescriptions are directed to be compounded by *Avoirdupois Weights*, the ounce being subdivided as in Troy Weight into 8 drachms or 24 scruples, in Ireland. The London and Edinburgh Colleges direct *Troy Weights* to be used in England and Scotland.

APOTHECARIES' WEIGHTS. (IRELAND.)

1 Pound = 16 Ounces = 7,000 Grains.
1 Ounce = 8 Drachms = 437.50 Grains.
1 Drachm = 3 Scruples = 54.68 Grains.
1 Scruple = 18.22 Grains.

APOTHECARIES' WEIGHTS. (ENGLAND AND SCOTLAND.)

1 Pound = 12 Ounces = 5,760 Grains.
1 Ounce = 8 Drachms = 480 Grains.
1 Drachm = 3 Scruples = 60 Grains.
1 Scruple = 20 Grains.

The proportion between the two tables may be shortly stated as follows :—

1 Pound troy : 1 Pound avoirdupois : : 144 : 175
1 Ounce troy : 1 Ounce avoirdupois : : 192 : 175

SYMBOLS EMPLOYED.

The Pound	℔
The Ounce	℥
The Drachm	ʒ
The Scruple	℈
The Grain	gr.

---

* This table has been prepared with the kind assistance of the Reverend Professor Galbraith, Trinity College, Dublin.

The Fluid Measures employed are the same in the three British Pharmacopœias.

1 Gallon = 8 Pints = 277.274 cubic inches.
1 Pint = 20 Fluid Ounces.
1 Fluid Ounce = 8 Fluid Drachms.
1 Fluid Drachm = 3 Fluid Scruples.
1 Fluid Scruple = 20 Minims.

SYMBOLS.

The Gallon	C. or Cong.
The Pint	O.
The Fluid Ounce	f℥
The Fluid Drachm	fʒ
The Fluid Scruple	f℈
The Minim	♏ or Min.

FRENCH WEIGHTS AND MEASURES USED IN PHARMACY,

With their English equivalents.

Calculated from the Tables in "Galbraith and Haughton's Manual of Arithmetic."

WEIGHTS.

Milligramme = 0.01543 Grains.
Centigramme = 0.15434 ,,
Decigramme = 1.54340 ,,
Gramme = 15.43400 ,,
Decagramme = 154.34000 ,,
Hectogramme = 1543.40000 ,,
Kilogramme = 15434.00000 ,,

APPROXIMATE VALUES.

Gramme = 15½ Grains.
Kilogramme = 35¼ oz. Avoirdupois.
,, = 32 oz. Troy.

FLUID MEASURES.

Millitre = 0.00176 Pints.
Centilitre = 0.01760 ,,
Decilitre = 0.17607 ,,
Litre = 1.76077 ,,

APPROXIMATE VALUES.

Millitre = 17 Minims.
Centilitre = 8½ Scruples.
Decilitre = 3½ Ounces.
Litre = 35¼ Ounces.

The weight of a Litre of water is one Kilogramme.

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